COTTON

Volume LXXX
Number Nine
Ten Cents a Copy

JULY, 1916

Published Monthly by
W. R. C. Smith Publishing Co.
Dalton, and Atlanta, Ga.

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FIRE
EXTINGUISHERS

FIRE PREVENTION REGIMENT OF MEMPHIS TERMINAL CORPORATION

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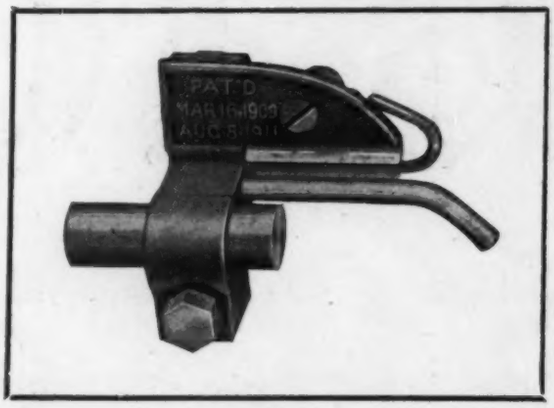
Makers of a Complete Line of Fire Protection Appliances

Index to Advertisers, page 172. Table of Contents, page 37. Buyers' Guide, page 173



The MacColl Patent Spooler Guide

will, with a much more open setting, remove slubs or bunches that would pass through other spooler guides;

it will allow small piecings and knots which are unobjectionable to pass through;

it will pluck loose slubs and imperfections from the yarn without breaking, holding the slubs, etc. in the teeth until they are cleaned

it is easily set, cleaned and adjusted;

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JUL 15 1916

COTTON

Published Monthly by

W. R. C. Smith Publishing Co., Dalton and Atlanta, Ga.

L. L. ARNOLD, Editor.

Editorial and Advertising Departments Grant Building, Atlanta, Ga. Subscription price, $1.00 for two years; Canada, $1.00 a year; Foreign, $1.50 a year. Entered at the Dalton, Ga., postoffice as second-class matter.

Contributions to the columns of Cotton are solicited and paid for after publication. The names of contributors need not necessarily be used, but must accompany all manuscripts.

Orders for any change in advertising must reach Atlanta previous to the 10th of the month preceding month of issue, otherwise publishers cannot be responsible for changes.

When changing address, *notify us*, not the postmaster. Always give the old address as well as the new one.

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Volume 80. **Member Audit Bureau of Circulation.** **Number 9.**

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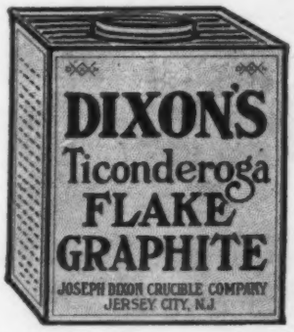

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Direct representation, commission basis preferred.

A unique opportunity to take advantage of well established connections assuring satisfactory and permanent business.

Fullest investigation solicited.

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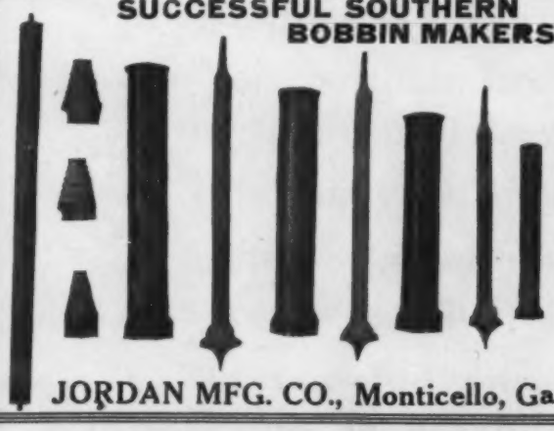

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Allen Safety Set Screws

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Allen Socket Cap Screws

are very neat in appearance and exceedingly strong.

Send for Circular No. 21 and free sample for testing.

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Have the right "feel" and appearance

An important feature of our loom harnesses is their appearance and their "feel." Their smooth finish and freedom from defects show that they will weave well and their soft pliable "feel" shows that they are tough and elastic and will therefore wear well.

GARLAND MFG. CO.
SACO, MAINE
Formerly Loom Picker Co. : : : Biddeford, Maine

G TRADE MARK

(Photo by Davis.) WHERE ONCE STOOD AUGUSTA'S SHINGLE ROOF HOUSES

Banish the Wooden Shingle.

The best way to fight a fire is to anticipate it. Besides eliminating the human risk, it's a thrifty method. While the fire alarm is a great producer of nerve thrills, there are other and less expensive means of entertainment.

A great deal has been and is being done for fire protection. This should be particularly applicable to textile establishments, as the record of one great insurance company shows that of the 823 fires reported during the year ended April, 1916, over half, or 438, were in or connected with textile plants.

The National Fire Protection Association in a summary of sprinklered fires covering a period of 19 years show a total of 17,533 fires, of which 4,623 were in cotton mills, 627 in knitting mills, and 171 in dyeing and bleaching establishments. The fact that the losses from these fires average very low is but another indication of the care and attention given to modern protective apparatus, and particularly to devices that extinguish the fire in its incipiency—up-to-date plants are being equipped not only with automatic devices, but also with hand operated equipment within easy reach of the employees.

But why devote so much energy to fire protection and so little in comparison to fire prevention?

The ultimate object of all fire prevention work is the reduction or elimination of conditions causing the spread of fire. With very few exceptions, the money expended for fire protection is devoted almost entirely to the means for fire extinguishment within the mill. This was admirably illustrated at the Naumkeag mill during the big Salem fire, when it was shown that adequate preparation for external hazards had been omitted. The mill community is no different from any other small community in this regard. They scarcely ever have a building code, and an adequate inspection of dwellings is the exception rather than the rule. Moreover, the average mill village in the South is typical in its construction and contains the three main hazards that have featured the recent great conflagrations in the South at Paris, Texas, Nashville, Tennessee, and Augusta, Georgia —namely, wood shingle roofs, light frame construction and open foundations. It might be well to add, in parenthesis, that the first two of these hazards were also present at the great fires in Chelsea and Salem, Massachusetts, as well as in many others.

Only one of these hazards will be given attention at this time and that is the wood shingle as utilized in the large majority of mill villages. Once a shingle roof gets well ablaze, each one of its many shingles becomes a flaming brand to carry the fire to other roofs. How receptive these other roofs become is well emphasized by some of the recent fires mentioned. For example, at Paris, Texas, last March, of the 1440 buildings destroyed 1051 had wood shingle roofs.

In reporting this conflagration to the National Fire Protection Association, State Fire Marshal S. W. Inglish said:

"A most important lesson to be drawn is the hazard of the shingle roof. Modern history does not contain a more perfect example of the conflagration hazard that is present in every city or town where the shingle roof is prevalent. The burning of the business district of Paris was not due to a lack of fire fighters; it was not due to a lack of water; it was not due to the construction of the business district itself, but was primarily attributable to the shingle roofs of the residence section of the city. The firemen were not able to hold the blaze to the first building being burned, for the reason that the brands carried by the high gale had set on fire buildings, four, five, six and even ten blocks away and in practically every instance the fire started on the roof of the building. These in turn would send their burning brands on the wings of the wind to other buildings with shingle roofs until every dwelling on both the south and east sides of the business section was a seething, roaring mass of flames; and, notwithstanding the fact that the roofs of the business buildings had refused to take fire from the burning embers that had fallen upon them like rain or hail for some time, when the half-circle of fire around the business district had closed in, the intense heat of the wind-driven flames and the flying brands and coals which were many inches deep in the streets, broke through the windows and doors, and, when once an entrance was effected, the doom of the business section was sealed. Had the roofs of the dwellings in the path of the fire from its point of origin to the business district been of non-combustible material, it is believed the fire department of Paris alone could have easily held the blaze to at least the block in which it originated."

The estimated property loss in this fire was ten million dollars.

The day after the Paris fire, Nashville made a bid for attention with 648 buildings destroyed and with an estimated property loss of 1½ millions. The special report of the Tennessee Inspection Bureau contained the following extracts:

"Shortly after the fire started, 33 frame dwellings located from 100 to 1,000 feet southeast of the planing mill were on fire; of this number 18 were covered with shingle roofs. It is here that the hazard of shingle roofs is more forcibly illustrated than ever before.

"At about 12:20 the firemen succeeded in controlling the fire in the 33 buildings located in the first zone, but due to the increased velocity of the wind, burning shingles were carried across an 1,800 foot clear space and ignited other shingle roof buildings on Main and Howerton Streets, resulting in a second conflagration in the more thickly populated and high valued residence section of East Nashville."

"The chief lesson taught by this conflagration, that destroyed the best portion of the residence section of East Nashville, is that if sweeping fires in American cities are to be avoided the hazards which invite them must be eliminated or minimized.

"Light frame construction and **especially shingle roofs** were undoubtedly responsible for fire starting in the second zone. If the hazards of quick burning construction are to be minimized in cities and towns the power lies solely in the hands of those who have legislative control of the common welfare, and public sentiment should stamp with everlasting approval the legal abolition of the shingle roof and encourage only that type of building construction which resists fire as well as time."

At 6:20 P. M. of the same day that Nashville performed, Augusta, Ga., took the center of the stage with a fire that lasted a part of two days, and destroyed 682 buildings, with a property loss of 4¼ millions. Three thousand persons were made homeless and one thousand thrown out of employment.

Although Broad Street is 165 feet wide, and Greene Street, two blocks southwest of Broad Street, is 162 feet, either of which should have made a good fire-break, sparks and brands fell upon the frame dwellings which predominated in that section southwest of Broad Street, ignited their *shingle roofs*, and the conflagration then had an unimpeded path four blocks wide to the city limits, with plenty of fuel.

In the city of Birmingham, Alabama, the fire department reported 406 alarms during the month of March this year, of which 286 were caused by sparks on *wood shingle roofs*.

A South Carolina mill lost a line of houses on one street, the fire practically burning itself out.

In the fire record of a Georgia mill during recent months may be noted the following three fires: At 8:35 A. M., fire broke out in the boarding house, a spark from the chimney igniting shingles on the roof. * * * Sparks from the chimney set fire to the roof of the house at No. —— —— Street at 8:30 A. M. * * * A fire occurred at 12:55 P. M. in tenement house No. —, cause unknown. All of the roof and part of the upper story was burned.

At another Georgia mill, fire was discovered at 2:30 A. M. in a building which was not insured. This building was destroyed and sparks were carried by the strong wind for some distance to three foremen's dwellings. On one of these the shingles of the roof were slightly damaged; on another a considerable part of the roof was burned; while the third lost the larger part of the roof and the interior finish on the second floor.

A South Carolina mill reports two shingle roof fires from chimney sparks within a period of six months.

All these small vallage fires were potential conflagrations and it was only a matter of chance that any one of them did not assume proportions that would have seriously crippled the production of the mill, until arrangements could have been made to house and care for its operatives and their dependents.

These are by no means isolated instances, and many others could be cited if space permitted. However, these will serve as illustrations of a dangerous practice that should be abolished by the adoption of roofing materials of a far more permanent and non-inflammable character.

Spontaneous Combustion.

Fires caused by spontaneous combustion are of less frequent occurrence, no doubt, than the press accounts would indicate. Owing to a lack of sufficient evidence as to the real cause of a fire, spontaneous combustion is given the blame. All other theories having failed to be proven to a certainty, spontaneous combustion is given because that is a possible solution and cannot be disproved. However, it cannot be doubted that many fires are started in this way, Also, many fires started in this way could have been prevented by a reasonable amount of care.

A great number of substances of various kinds can be heated to the point of spontaneous ignition. There are many substances in which this can occur, amongst which are: coal, wood, sawdust, oils, varnishes, greasy rags, such as rags used to clean machinery, cotton waste, etc.

Coal is, perhaps, the worst of the lot, as it contains substances which ignite readily. Greasy rags should never be left in a warm place. Low temperature is a good preventative, as spontaneous combustion cannot occur with a low temperature. If a bundle of waste soaked in oil were placed in a warm confined space it will soon rise in temperature to two hundred degrees Fahrenheit.

An actual example of this occurred last February at Cumberland Mills, Maine. At 4:30 A. M., the watchman discovered fire in the pipe shop at a paper mill among oily rags contained in a galvanized iron receptacle which had a tightly closed cover. The receptacle was taken out of doors and the fire extinguished, so that no damage resulted. This shows the advantage of using metallic waste cans with an automatically closing top to hold the oily waste used in the cleaning of machinery.

Safety first.

A Production Incentive.

Just at present, when the majority of mills have more orders than they can fill, and every mail brings fresh inquiries, mill managers are devoting much time and thought to the question of increased production. It is, of course, very evident that any increase in production, without the addition of machinery, correspondingly reduces the overhead costs and increases the profits.

The use of the premium or bonus system over and above a certain amount of product, usually based on piece work prices, has been and still is widely used.

The bulletin board has also met with the approval of many department heads, who find that the individual inter-

est aroused by the posting of individual or group records has resulted in increased production and improved product.

A production incentive devised by a Georgia mill is based on the premium idea, but it pays these premiums for regular attendance at work. For example, the women employed by this mill are paid a bonus of ten cents for every dollar earned in a period of four weeks, provided that during those four weeks the operative has not lost over eleven hours. Thus a woman who loses two days in four weeks would not only lose the two days' time, but also the bonus.

The men at this mill are not allowed any limit for lost time, but are paid the 10 per cent bonus if they work the four full weeks. For example, a doffer making $2.00 per day, in the four weeks earns $48.00 and his bonus would be $4.80, but the loss of one day to go fishing would cost him his wage of $2.00 plus his bonus of $4.80.

Quite a mess of fish may be secured for $6.80 and the average ambitious young man is working steadily and planning to have his fishing trip when his personal services are not so much in demand.

The Prize Contest.

The winner of the advertising contest prize for April, 1916, is William M. Aspinwall, overseer of experimental work in the carding and spinning departments at J. & P. Coats, (R. I.) Inc., Pawtucket, R. I.

There were so many *good* letters in response to the April announcement that lack of space prevents their mention.

This announcement was due to appear in the June number, but was unavoidably delayed. The contest will be repeated in the September number, when another of the $5.00 indicators will be given to the winner.

The Winning Letter.

The Cyclone Fence Co., certainly has a real "eye opener' 'of an advertisement in the April issue. My reasons for this belief are as follows:

1. The "eyes" in the links of the fence demand inquiry.
2. The statement that "A million eyes watch your factory," demands still further inquiry.
3. The links in the picture show strength and the "eyes" watchfulness. The explanation of the "eyes" is given in a few well chosen sentences and cause one to compare the desirable qualities of the fence with the usual undesirable qualities of the man. For example:
1. The fence guards on all sides, at all times; while the man guards a certain section, at a certain time.
2. The fence is steel, which implies strength; the man is flesh and subject to various weaknesses.
3. The fence price is the initial cost; the price of man is a continued cost.

The general statements of process and material, a few remarks on the different heights and styles, show that the manufacturers of this fence, are not limited to any one kind of fence.

Inquiry is solicited from interested parties, to any of the present users of this fence, and to show that workmanship and material is of the best, the Cyclone Fence Co., guarantees satisfaction both as to goods and service. To aid prospective buyers they are willing to send their experts to aid in installing a system.

In conclusion I wish to say that there are other full page advertisements in April COTTON with many more words, but in my opinion there is none with so much thought expressed so clearly.

Pawtucket, R. I., June 12, 1916.

L. L. Arnold, Editor COTTON,
Atlanta, Ga.

Dear Sir:

I received your letter and the counter and was greatly pleased to learn of my success. I realize that your magazine covers a vast territory, and to be the fortunate one in such a field is very gratifying to me. I thank you for the pleasure you have accorded me, and I promise you that the indicator will see plenty of active service.

Sincerely,

(Signed) Wm. M. Aspinwall.

Education by Motion Pictures.

The motion picture has become one of the greater educational forces in America. Everybody understands the language of pictures. They exceed the limitation of words and the most indifferent are reached by their appeal. As the result of this, we are living in an era of pictures. The large towns have many and nearly all the smaller mill villages are equipped with a picture house, frequently owned or controlled by the mill management. Realizing the value of securing this educational force behind the movement for fire prevention, the National Fire Prevention Association collaborated with the National Motion Pictures Company for the production of a 1,000 foot film entitled "The Fire Demon," which would illustrate the causes of most fires and their prevention. The following synopsis is reproduced merely to convey the idea of the various scenes and actions, all rights being reserved by the National Motion Pictures Company, although they have temporarily abandoned its use:

Spontaneous Combustion. Interior of a store; janitor busy polishing a show case. Floor has been newly oiled, as the oily mop and other paraphernalia nearby show. He hears the strains of a band from the street. A few minutes more and his work would be done, but he cannot resist the call of the music. He hurriedly sets the mop, dripping with oil—together with the oily waste and furniture polish—carelessly in the closet, under the stairway, although in doing so he is confronted with the sign

CLOSET UNDER THIS STAIRWAY CLOSED BY ORDER OF FIRE INSPECTOR.

And another rule of the store comes to his mind—

NEVER PUT AWAY OILY RAGS OR MOPS IN A CLOSED PLACE.

Late at night—Fire generated from spontaneous combustion and the store suffers heavy fire loss.

Smoker's Carelessness. Neglected Cellar. Fire Inspector making survey of a wholesale house; showing a badly kept basement with a lot of inflammable material lying about closely piled together; rickety steps and open grating. Inspector leaves a notice to clean up basement and make repairs. (Reproduction of order here). Indifferent proprietor throws notice aside.

Later—Young man going along street smoking, care-

lessly tosses away lighted cigarette, which falls through the open grating onto some scraps of paper in the basement of the wholesale house. Result—Large fire. Proprietor very much distressed as a vision of the Fire Inspector's notice comes to his mind and he thinks too late—"If I had only heeded the warning."

Sparks from Chimney. Sparks from a chimney start a slight fire. Fire authorities point out to the owner the close proximity of the neighboring houses and advise him to put on *fire-proof* roof. But this is the first fire he has had, the damage is slight and he does not want to go to the extra expense for a fire-proof roof.

Few months later another fire from this chimney completely destroys this house, together with roofs of adjoining houses.

Result—Suit for damages from adjacent property owners and the city.

Defective Chimney. A tenant sees bad condition of chimney and notifies landlord. Landlord procrastinates.

Result—Fire destroys the house. Damage, $5,000. Cost of repairs to chimney only $10.

Electric Wiring. Factory interior. Arrangement is being changed and the handy man and jack-of-all-trades is making changes in the wiring. Proprietor sees in phantom —"Inspection Bureau must pass on all electric wiring," but he thinks it will be all right. The wires are overloaded and in some places exposed, tacked up with common brads.

Result—Fire. The insurance company refuses payment of the policy because the wiring had been disturbed without authority.

Cleaning with Gasoline. Woman preparing to clean gloves with gasoline. Is about to light gas stove when a vision of a terrible accident which befell a friend stops her.

Vision—Showing friend cleaning gloves with gasoline near a light. Explosion, fire and permanent injury to her.

Matches—Children. Scene in children's nursery. Two little tots asleep in bed, while an older boy plays on the floor with matches.

Showing mother at corner grocery, where clerk is showing some safety matches. Demonstrates them; shows metal case for holding matches out of the way, especially desirable where there are children.

Little boy meanwhile has lighted several matches and one which he has thrown aside falls on a scrap of paper under the bed. The blaze catches the mattress, which is burning briskly when the mother enters. She is horrified at the thought of what might have happened and after it is over she decides to use the safety matches for her children's sake.

Gasoline Explosion. Young man building fire in heating stove; goes for the coal oil. Two cans—gasoline and kerosene—stand side by side. Boy picks up first can, which is gasoline. Enter young man's father, who takes can from him and cautions him about the danger of using oil. When he notes it is gasoline he is very vehement as to the gasoline danger. Son insists he must use oil. Father pushes him disgustedly aside and proceeds to build fire himself. Son stands looking on sheepishly.

Later—Early morning; Son building fire. Watches it kindle; it is slow; boy gets impatient and goes for oil. Takes kerosene can. As he pours it out a flash from the smoldering kindling touches the can. Explosion follows and fire. Young man is seriously burned.

Conclusion. Blackboard showing a hand-writing- -

FIRE LOSSES IN THE UNITED STATES AND CANADA ALMOST $226,000,000 PER ANNUM. THE UNITED STATES GEOGRAPHIC SURVEY SAYS OVER HALF OF THESE LOSSES WERE EASILY PREVENTABLE. WILL YOU HELP REDUCE THEM?

Protect the Window Openings.

BY A. H. PERRY.

The science of fire protection has made enormous progress in recent years, and while the annual fire loss in this country hovers around $300,000,000, conditions are such that only a high degree of efficiency prevents a figure several times larger.

Seventy-five years ago it was practically impossible to secure fire insurance on a cotton mill on any terms short of confiscation. In point of danger cotton mills and powder factories were in the same category. In them were combined about all the features of construction and methods of operation that modern experience has shown to be most conductive to the start and spread of fire. Today cotton mills are regarded as almost ideal risks and are insured at a rate so low as to be no longer a factor in the financing of the company.

There were two influences serving to bring about this change: the work of Edward Atkinson and the engineering organizations founded on his work, and the automatic sprinkler. It was early realized that the greatest economies to be effected lay not in the underwriting but in the engineering field. That to secure cheap insurance it would be necessary to improve physical and operating conditions—to erect buildings that in construction and placement would offer the greatest resistance to the spread of fire; to equip with such apparatus and devices as would announce promptly the presence of fire and be most effectual in its extinguishment; to eliminate all unnecessary causes of fire, whether of carelessness or manufacturing processes, and to train employees in the methods of fire fighting. To bring all this about has been a vast problem, in the solution of which most of the arts and sciences have been drawn upon. Thus it is that the cotton mill of today, of slow-burning construction, with an equipment of sprinklers and automatic alarms and with no direct communications from floor to floor, offers but small likelihood of destruction by fire occurring within its own walls. There is little in all this, however, to provide against the attack of fire from without.

The exposure hazard is probably one of the most common conditions tending to augment the fire loss. It is shown from statistics that nearly one-third of the fire loss of the country is caused by ignition by fire from without the walls of the building itself; that is, by means of the door or window openings. Since wall openings must normally be open more or less of the time either to traffic or passage of light, the first type of protection took the obvious form of a sheet-iron door of shutter arranged to be closed at night. Practical experience, however, soon showed that any considerable amount of heat warped the sheet-iron shutter to such an extent as to seriously impair its usefulness.

A great improvement on the iron shutter came with the design of the tin-clad wooden shutter, a device largely used for many forms of wall opening protection. The tin-clad shutter, however, shared with the sheet-iron shutter several

defects. It was normally open in daylight hours, during which at least one-half of the total number of fires occur; it could not be closed quickly or certainly in the moment of emergency; when closed it did not permit a night fire in a building to be seen from the outside; it did not lend itself readily to the adoption of devices to close it automatically in the event of a fire; it was subject to rapid deterioration, and it was unsightly. Because of all these things a substitute was devised which would eliminate these weaknesses and which also possessed several advantages. This substitute was wire glass. The first practical and commercially successful process for the manufacture of wire glass was patented by Frank Shuman in 1892 and the following year he was awarded a premium by the Franklin Institute for the invention.

Wire glass in the early days of its manufacture, was made by what was afterwards termed the sandwich process by rolling a sheet of glass over which was stretched the wire mesh, and over that rolled another sheet of glass. This process was later improved upon.

In a paper read before the Insurance Society of New York on the subject of wire glass efficiency, Henry A. Fisk said in part:

"In considering this subject, we naturally have in mind two things: First the general utility of wire glass as compared to other well-known fire retardants, such as shutters; and second, the actual value of wire glass as shown by the fire record. Let us then first note its advantages or disadvantages, taking into account not only the fire record but general utility and service.

"The wire glass window can be used on all classes of buildings and on all sides, including street fronts.

"In all ordinary buildings of ordinary or superior construction it is considered essential to protect floor openings and at least retard, if not prevent, fire spreading from one floor to another, and yet, almost universally, we find no protection on one or more sides for the window openings, and fire easily finds its way from one floor to another in this way. Two notable examples right here in New York City were the Parker and Asch Building fires. In the latter case the fire started on the eighth floor, while the loss of life was on the ninth, and it is quite possible that few or no lives would have been lost if all the windows had been protected with wire glass, it being apparently the concensus of opinion that the fire spread from one floor to another chiefly by way of the windows.

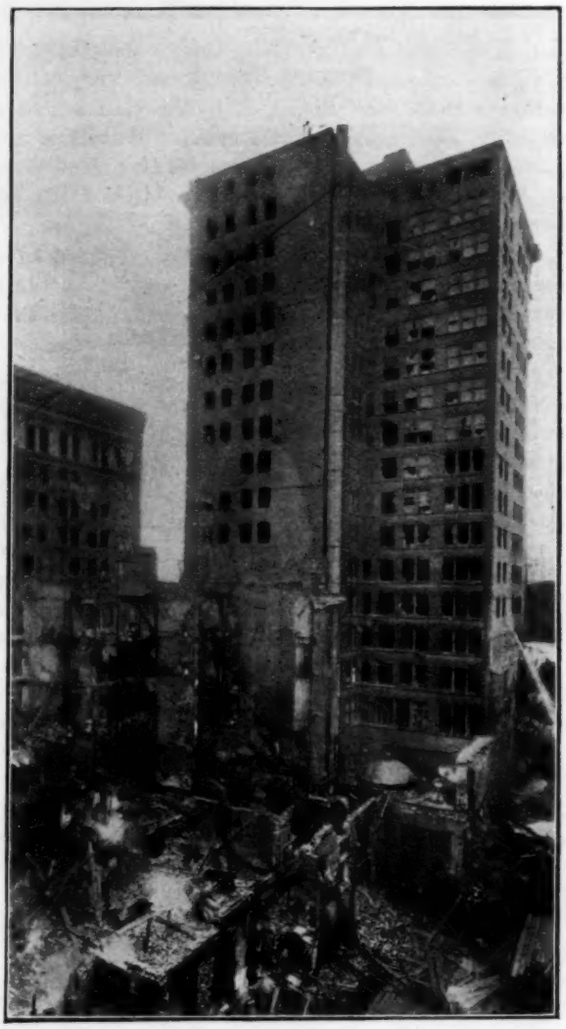
"The wire glass window is ordinarily closed at the time of fire. If open, it may be easily and quickly closed. It is tested as often as it is opened, and if not frequently tested it is because it is kept closed. It is susceptible of simple automatic closing, which should be reliable.

"Any device which is a protection against fire only will not receive the same care and maintenance as a device of daily necessity. The expense of maintenance is important, and the owner will naturally keep the expense at the minimum. Fire shutters are costly to maintain as compared to wire glass windows, which latter are really a help, the up-keep being less costly than the ordinary window.

"With wire glass fire may be seen from the outside. It may be broken easily by the firemen and is pecularly fitted to act as a shield for the firemen while allowing a hose nozzle to be poked through the glass.

"These are perhaps the more important features which have been shown by experience to be of real value, and they are borne out by the fire record, leading to but one conclusion, namely—that wire glass is generally adaptable for window openings, is quite certain to be in place when needed, and will necessarily be maintained in somewhere near its original condition."

An example of what the *lack* of approved metal frames and wire glass in all window openings will do to an otherwise up-to-date and fireproof building is shown in the



NOTE HOW THE BUILDING, WITH THE EXCEPTION OF THE WINDOWS, WITHSTOOD THE FIRE.

accompanying illustration which depicts the Union Trust Company building at Cincinnati, Ohio, after the Gibson House fire of 1912. It is an ideal illustration of the neglect of the exposure hazard. Similar examples may be seen in all parts of the country, the only difference being that these other buildings have not as yet been burned.

Besides its properties as a fire retardant, wire glass serves other valuable functions in cotton mill work. In the ribbed and figured surfaces it adds greatly to the effective diffusion of light, thereby increasing the productive capacity of the employees and reducing the cost of lighting. Other types, especially designed for skylight work, are so made as to eliminate all drip and conduct all condensation to a specially made gutter, thus saving spots on the goods and other troubles.

Georgia Cotton Manufacturers Convene

The sixteenth annual meeting of the Cotton Manufacturers' Association of Georgia convened in the assembly hall at the Hotel Ansley, Atlanta, on Tuesday, May 30th. While the morning session was not scheduled until 11 o'clock, the lobby floor was crowded the entire morning with interested members discussing business conditions and other topics of interest. Promptly at 11 o'clock President A. F. Johnson called the

Morning Session

to order and the Rev. Robert T. Phillips pronounced the invocation. The reading of the minutes of the last meeting was dispensed with and President V. H. Kriegshaber of the Atlanta Chamber of Commerce, addressed the delegates, welcoming them to the city of Atlanta.

Guy Garrard of Columbus, Ga., was scheduled on the program to respond to the address of welcome, but in his unavoidable absence Capt. H. P. Meikleham of the Massachusetts Mills at Lindale responded.

After the appointment of suitable committees the regular work of the program was taken up and Dr. K. G. Matheson of the Georgia School of Technology gave an informal but very interesting talk on engineering research and its value to the cotton manufacturer. Dr. Matheson was followed by the Hon. Hal. M. Stanley, the head of the State Department of Commerce and Labor, who spoke to the subject "Cooperation," and discussed his subject very thoroughly from the various angles and view points. Mr. Stanley took as his texts "Behold how good and how pleasand it is for brethren to dwell together in unity," and "For the laborer is worthy of his hire." In discussing his subject he sketched briefly the history of industrial Georgia and showed how cooperation in different sections and among different peoples have brought that industrial development up to its present high standard. While he conceded that labor without capital is important and capital without labor cannot earn a return upon the investment, he believed that labor is entitled to a living wage and capital to a legitimate dividend. He also pointed out that discontented labor will develop sullen capital and unprofitable capital will always result in poorly paid operatives. "When there is a nice adjustment between the employer and the employee," he said, "the business prospers." Taking the subject of what the cotton manufacturers of Georgia are doing toward cooperating with their employees, Mr. Stanley continued:

"Every manufacturer sees to it that his machines are in first-class condition. How much more important it is to see that labor is in as good condition as the machines. Employees that are underfed and underclothed by reason of underpay or are broken down in strength by reason of excessive hours of labor can never be in as prime condition as the machines, and therefore, the best results are never obtained. Reasonable hours and a living wage make contented labor and contented labor earns dividends for the investors. Several years ago a large cotton mill in north Georgia changed the working hours from sixty-six per week to fifty-eight and the manager informed me that he was astounded to discover that the operatives, working eight hours less per week, turned out more work. The same manager finds it profitable to open up a savings department for the operatives and to pay them from two to two and a half per cent more for the $12,000 the operatives left in his hands than he would have to pay for money secured from his banker.

"Two weeks ago the manager of another north Georgia mill gave twenty-four of his employees leave of absence for three days that they might attend the meeting of a secret order in which they are interested, agreeing that their pay envelopes should include their average pay for the three days.

"A cotton manufacturer in the western part of the state found it profitable to double the pay of the operatives in an unproductive department and made it pay dividends. That manufacturer annually spends quite a large sum of money in what may be termed welfare work and finds that it is a good paying proposition.

"An Atlanta textile mill ten days ago donated a site valued at $18,000 to the City of Atlanta on which to erect a school building for the children of the mill district, which, if accepted, will give them every advantage afforded the children of more favored sections of the city. But for the generosity of the stockholders of this mill these children would, of necessity, be denied the advantages of a modern school. One of the conditions is that manual training be taught.

"Another Atlanta mill sometime since appropriated $500 for a baseball park for the operatives, organized a band and is now engaged in other betterment work. This mill has organized a savings bank and pays the operatives interest on the money thus deposited, which interest is greater than the mill pays the banks for money.

"In north Georgia there is a military company composed entirely of cotton mill employees, and whose commanding officer is manager of the mill. Last year this company was given the highest marks by the United States army inspectors of any military organization in the state.

"A short time ago it was my pleasure to hear concerts by two cotton mill bands, promoted by cotton mills, and I am sure that there is not a band in the city of Atlanta that can furnish better music. The members of these bands are not what are considered favored employees, such as superintendents, clerks, foremen, sub-foremen, etc., but weavers and spinners, showing that those who are commonly classed as operatives are not ignorant menials with low ideals, but men and women of average intelligence and whose impulses are to make useful citizens.

"Many of you have built and equipped schools at your mills and in some instances there are those among you who pay the tuition of what may be termed mill-children, that they may be grounded in the rudiments of an English education.

"Those of you who have tried these things are convinced that when there is perfect cooperation between employer and employee; cooperation that means adequate pay for an honest day's work of reasonable hours, the very best results are obtained."

The next address on the program was by E. L. Worsham, the state entomologist for Georgia, who spoke on the subject "The Boll Weevil in Georgia." Mr. Worsham was thoroughly at home with his subject, which he illustrated with a number of maps and also with samples of the boll weevil, which he passed around among the audience for inspection. Immediately upon the conclusion of Mr. Worsham's address, President Allen F. Johnson delivered, the

President's Address

and spoke in part as follows:

"At the time of our annual meeting a year ago we were most anxious about conditions brought about by the European war, as business in most lines of cotton manufacture was paralyzed by the first shock of the war. Conditions at that time were improving, cotton had advanced from the extreme low price of seven cents in December to ten cents in May, which was brought about by the holding movement, supported by the Federal reserve banks and our national and state banks, confidence was taking the place of doubt and uncertainty, and with improved conditions, the price of cotton goods and yarns soon followed the advance in cotton, the demand being sufficient to absorb all stocks as well as the production.

"The first effect of the war was paralyzing to business in this country, the second effect was that of great industrial stimulus in all lines of manufacturing, and we are under that influence now. Labor is more fully employed than ever before, and at more remunerative wages. The nations at war have placed large contracts with us for such of our manufactures as they need in carrying on the war, and it is undoubtedly this foreign demand which has given this stimulus to manufacturing. The question now is, how long will this demand last, how soon will the war be over, what will be the effect when it is over? It is a sure thing that the high tide will be reached during the war, if it has not already been reached, and where we will be when normal conditions are restored we cannot tell. It behooves us now to make the best of present conditions and fortify ourselves for conditions which will exist when foreign competition is restored.

"Those who force production to the limit by night operation, and at the expense of upkeep of machinery, will find themselves unable to compete, unless a sufficient sum has been set aside to bring their plants up to a high state of efficiency.

"The stress of economic competition between the nations will no doubt be greater after the war than ever before. With the nations at war, there will be the great incentive to recover lost ground. The number of operatives will be reduced by a long list of casualties, but others left without former means for support will be forced through necessity to take their places, and then manufacturing institutions will be quickly started up on the class of goods and for the same trade each held formerly. Our manufacturers will then feel the effect of this competition, and if we get away with it, it will be through methods requiring the greatest efficiency and economy.

"Organized industries in this country are doing more practical work each year along the line of 'community work.' It is generally conceded that a workman's efficiency is increased through education, health, contentment and happiness in his life outside the plant, and many industries are promoting this efficiency by providing kindergartens, day and night schools, adequate and sanitary living quarters, hospitals, libraries, and some form of entertainment and amusement. Our southern mills are foremost in this work, and many of us who started this plan in a small way some time ago have found it so beneficial that the scope of the work has been gradually increased. The new mills being built seem to all pay special attention to this work, and are providing for these features in the mill village from original capital investment, as they are a good investment for the mills. At one mill I know of under construction, the village grounds are being laid out by a landscape gardener and the work carried on under his direction. Another mill which has tried out and found the benefits of better community life has recently bought a large grove adjacent to the mill, to be used as a park and play ground for the

RETIRING PRESIDENT A. F. JOHNSON.

children. Frank Trumbull writes in a recent bulletin of the American Chamber of Commerce:

"'Industries which have undertaken such practical work have passed from the welfare stage of this work into the new spirit which is abroad in business. It is now considered as part of the cost of production, and from an efficiency standpoint to industry and an increase of total wealth to the community of which each is a member. It is no longer being done to "help" the workman, and the middleman is being gradually eliminated. Industry is now assuming the risk of citizenship, as well as those of physical and efficiency conditions.'

"A large majority of the mills in Georgia are interested in 'community work', and are carrying on some features of this work. It is to be hoped that all will realize its practicability and do more in this direction.

"No important legislation has been passed during the year affecting our industry. The Keating-Owen Child Labor Bill, which passed the House sometime ago, is still pending in the Senate. You are all no doubt familiar with the provisions of this bill and the effect it will have if it becomes a law, on your business and on your employees. It provides for Federal inspectors, which is repulsive; it usurps state authority, which is against the spirit of the constitution; and it regulates production under the guise of regu-

lating commerce, which is invalid. The effect of this bill in the southern states, should it become a law, will be to prohibit the working of children under sixteen years of age in our cotton mills, and it will be a serious hardship on those children between fourteen and sixteen years of age who are dependent on their labor for support. A few will be able to avail themselves of school privileges, but the large majority will have idleness forced on them with its disastrous consequences. While there seems to be a strong probability that the bill will pass, we hope the Senate will give its attention to matters of more national concern."

The next address on the program was on

Mill Village Life and Community Work

by the Rev. Robert T. Phillips. Mr. Phillips said in part:

It is the obligation of every industry to be interested in the life and welfare of the employees in that industry, and it has been my experience in coming into contact with those who are actively engaged in the management of cotton mills—the men who have actually to face the needs of the people they work with who are face to face with the conditions in the lives of these people and are confronted with the great problems of efficiency and production, that they are intensely and earnestly interested in their employees' welfare and betterment.

Before we can approach the subject of community work and the upbuilding of the lives of mill people by definite social and welfare work among them, there are certain things which must already have been done. I am not a manufacturing expert, yet I know that for success to attend the endeavor of a mill in behalf of its people, the organization of that mill must be such that it stimulates a mutual feeling of confidence among the persons it employs. In like manner it is foolishness to put into a mill village, in which the elementary features of sanitation have not been observed by the mill corporation, any corps of workers to palliate evils which can be entirely eradicated by proper care and attention. The first things must be done first, or the people whom we seek to help shall themselves realize the falsity of what is being attempted and rise in just and righteous indignation against them.

The mill operative in the first instance should be made to know that the corporation for which he is working is going to give and is giving him a square deal, has provided healthful conditions of life for himself and his family and has given him reasonable educational advantages for his children.

Then we must have some understanding of the mill operative before he became such. Some speak of the problem of the mill operative as if there were not a problem before the operative came to the mill. There was then a rural problem which men have only within the last decade come to take seriously. The mill hand, then a farmer in isolated communities, or in the mountains, was already a problem. He was inadequately educated, out of the currents of the world's progress, and remote from the highest and most stimulating social intercourse. The very fact of his being in the mill today testifies to the fact that he was unable to take advantage of all his opportunities and was lacking in some of the elements which constitute the most efficient types of citizenship.

He needed help in those days and there are certain elements of life which had they been fostered among the rural population would have reduced the seriousness of the present problem. In coming to the mill the undeveloped personality is still further hampered in being introduced to a life with which he is unfamiliar and through prejudice, lack of education and a native suspiciousness he is still unable to and has not the spirit of progressiveness to take advantage of the opportunities which have presented themselves in greatly increased number in the well appointed and thoroughly modern mill village. The problem is one not so much of what we can do for the mill operative, but what can we put into his life to enable him to do for himself.

The conditions of mill life and the problem presented by the present day mill operative is of vital importance to the mill corporation. Your president in his report has just made mention of the necessity of doing something to meet the competition which shall be present after the war. The mills are confronted with the necessity of developing something within their employees which shall make for their efficiency. It is possible to do many things under a spirit of compulsion which shall develop automata, but the highest progress demands an efficiency of life as well as work.

Henry Ford, whom few perhaps follow in all his views, but whom many admire for business vision and power of organization, has realized the folly of having mere machines for his work and in his very elaborate welfare work has provided for the development of men. He has found the necessity for the development of the power of soul in men. It is that which sends every man to his task with vision and with creative power. The mill operative's need is for the power of soul which will enable him to realize his opportunities and take hold of them.

In the development of this power, the community, with the mill corporation, is alike interested, for the same power leads men into the fullness of personal and corporate life. The mill operative of today has little sense of the solidarity of human life and especially of the interdependence which characterizes the highest social life. The community in its highest expression, the Church, should be co-laborer with the corporation in developing the social instincts of the mill people, and contributors to the development of the power of soul and vision.

Now we can ask ourselves what shall be the form of the community work undertaken? In answering this question I must refer you to the work we have in LaGrange, Ga., where we find the Episcopal Church working in cooperation and with the support of the mill corporations among whose operatives the LaGrange Settlement is situated. The character of the work done in the settlement falls naturally into four classes: remedial, recreational, educational and spiritual. Under the remedial is classed the work of the hospital and the relief work done through the settlement as the agent of charitable individuals and organizations and also that finer type of relief work which is accomplished through the sympathetic guidance and advice of the settlement workers. Under the recreational work may be classed the plays, entertainments, play ground and various clubs which have been stimulated and developed among the people from the small boys and girls up to the older men and women. Under the educational work we have the kindergarten, the boys' and girls' gardens and the work of the visiting nurse, which is most valuable as preventive. The spiritual work is the fullness of all the work we do, and is stimulated in Sunday school work and Church services.

I have not emphasized the mechanics of the work but have merely suggested them as they are to be minimized. What we want to do is to put life in its fullness into the midst of the mill village and this can be fostered not by handsome buildings and well appointed kindergartens alone, but needs rather the consecrated purpose of the mill corporation and the devoted and consecrated service of women, trained in the knowledge of mill people, who will live among them sharing their lives and stimulating among them all those forms of social endeavor which enrich the human personality and life, giving it power to accomplish and to dream.

At the close of this address the morning session was adjourned, the delegates receiving instruction to meet in the lobby of the Hotel at 7 P. M. for the Association's annual banquet.

Evening Session.

Immediately upon the conclusion of the banquet the delegates again repaired to the convention hall, where they were called to order at 8:30 P. M. by President Johnson, who introduced Hon. Charles Lyon Chandler, the South American Agent of the Southern Railway, who gave an interesting discourse on the subject of export trade to South America and spoke in part as follows:

What is needed in every phase of the healthy development of the cotton manufacturing industry is closer cooperation and a more analytical study, not so much of how to make two bales of cotton do more work than one did before, but how to definitely make the South absolutely indepentent in every phase of the business so that we will not have to send our goods elsewhere to be bleached or otherwise made ready for the domestic as well as the foreign market. It seems to me that in just such proportion as we intensively develop and localize our cotton manufacturing industry will be be in a so much better position to take our share of the export opportunities now awaiting us all over the world, but more especially in South America.

There is absolutely no branch of our export trade in which we have done so little as in cotton goods of all kinds. Again and again I hear the excuse that "we have so much business at home that we can't waste our time on foreign markets." That is all very well, but how about the time when we have dull home markets? Depression never strikes the whole world at the same time, unless in cases of abnormal international upheaval such as in the first few months after the outbreak of the European war.

There are two or three stock ideas about South America of which I wish to disabuse your minds. The first is, that that continent is filled with ignorant savages who are so occupied with revolutions that they cannot tell denims from ginghams. When I tell you that no state in this Union has a larger percentage of pure white people than the Argentine Republic or Uruguay, you can readily see that in temperate South America, at least, these countries are not as degenerate as we have been led to suppose. We must always remember that South America is divided into two distinct parts, the tropical and the temperate. Buenos Aires has very nearly the same climate as Charlotte, N. C., while as we go further south it becomes much cooler and a different grade of clothing and textiles must be used. Almost every South American country has its own peculiar wants and requirements in the cotton goods line. In some of the countries there are cotton mills which supply a cretain percentage of the local consumption. In Peru the cotton mills, all of which use Peruvian cotton, supply about 25 per cent of the local demand, while in Brazil about 70 per cent of the cheaper grade of goods comes from the local mills. This does not mean that there is not a considerable and growing market in cotton goods in both Peru and Brazil. I have just received a letter from a well posted American in Rio de Janeiro, who comments as follows regarding the market for American textiles:

Brazil as you know offers a good field for our manufacturers of the higher grades of cotton goods. Such lines as highly mercerized goods and fancy voiles, etc., which are beyond the ability of the local mills to turn out, are the ones in which the American manufacturers should specialize in this market. Manchester has been the large supplier in the past, controlling more or less 85 per cent of the business in these lines. Germany also did a share but not as much as in other lines. If we want to develop our business in cotton goods, we will have to have salesmen who know the textile business come here with complete lines of samples in the salable goods, and they should return twice a year during the buying seasons. In this way, they will soon get to know

PRESIDENT-ELECT W. J. VEREEN.

the market and their customers, and repeat orders will naturally go to the same houses. There are many complaints made that American manufacturers do not agree to ship assortments according to the wishes of the buyer, preferring to sell the cases as they are assorted at the factory. Then again, the buyers find that when they order a certain quality with a given number of strands to the 5 square centimeters (the custom house basis for calculating the tariff), the manufacturer will write or cable back that he cannot fill that particular order as the line has been sold out, or sometimes, he will just substitute another pattern, which may have a strand or two more to the 5 square centimeters and will therefore pay a much higher duty than the piece ordered. Those, however, are all matters which the manufacturers must study and no doubt they are, and will continue to do so as their desire to develop these markets grows."

But the greatest market, both present and prospective, for our cotton goods of all kinds is in the Argentine Republic. This has been one of the most neglected fields in the world, and it is one which, I am convinced that if our people will only follow the intelligent example initiated by some of our firms in sending people down there to get the business, that we will secure at least a fair share thereof.

There is nothing magical about export business. Very

much the same rules of success apply there as in success at home. I have repeatedly asked Argentine importing firms why they did not buy more from the United States and they invariably answered, until very recently, that our American firms had not shown the slightest inclination to do business with them. In order to convince you that there is a fish at the end of the line, I will tell you of the experience of two of the largest cotton manufacturing firms in the United States; one in the South, and the other in the North. About eighteen months ago each firm was thinking about South American business. The thoughts of one crystallized into action, and the thoughts of the other into innocuous desuetude. Firm "A" in New England, sent a highly qualified man to Buenos Aires with a full line of prices and samples and within eight months after this young man landed there they received orders aggregating $800,000. The firm which sent them a majority of these orders informed me that when they learned that I was trying to help southern manufacturers that practically all of this business could have gone to the South if our people had been willing to raise their finger. When we consider that Argentina buys over $4,500,000 worth of colored piece goods annually from England alone, in normal times, and that of her $10,000,000 worth of imports of colored piece goods the United States supplied exactly $9,711 in 1912, you can readily see what a chance we have if we only go after it. During the first year of the war although Great Britain's exports of piece goods to the whole of South American were only about one-half of those in 1913, we have only made a total gain of 11 per cent, or, to put it in figures, in 1915 England sold $19,000,000 worth of piece goods in South America as a whole, compared with $3,688,000 worth from the United States. Since that time, it is true, we have made considerable progress, but not as much as one like myself would desire who receives in almost every mail from Argentina, constant requests for American cotton goods of all kinds. Even sheets, in which we formerly did no business in Argentina, are beginning to be sold there from southern mills, and there seems to be no reason why we could not maintain it in the finer lines as well as in the cheaper class of goods. It is true that in Columbia and Venezuela, which as you know are the South American countries nearest to us, we have made great gains in all lines. The markets of temperate South America require a much larger range of cotton goods in far greater permanent demands than do those of the northern part of the continent.

As in many other lines, we have suffered from not having any large cotton importing houses in Buenos Aires and the other more important South American cities. There are at least a dozen English and German houses there who make a business of stocking cotton goods and carrying large supplies on hand, and in this manner they are able to keep in constant touch with the market. Until we have such American houses permanently established there we will be in the position of peddlers rather than of steady sellers. That there is certainly money in it is shown by the profit which these English and German houses have made, and here is an excellent opportunity for some of our southern cotton manufacturers to show their initiative in a new line which will not, in many respects be as difficult as were their first attempts to build up a satisfactory cotton manufacturing industry in the South.

At the conclusion of Mr. Chandler's address the reports of the secretary and treasurer, auditing committee and legislative committee were read and adopted.

The chairman of the resolutions committee brought in three resolutions, the first two relating to proposed national legislation detrimental to cotton manufacturers, and these resolutions urging the defeat of these measures were unanimously adopted and ordered sent to the representatives and senators of the state of Georgia in Washington. The third resolution concerned the merging of the Cotton Manufacturers' Association of Georgia and The Georgia Manufacturers' Association, which resolution was tabled on a motion by Fuller E. Callaway of LaGrange.

The nominating committee then reported, and the following officers were unanimously elected for the ensuing year:

President, W. J. Vereen, Moultrie, Ga.

First Vice-President, Lee M. Jordan, Atlanta, Ga.

Secretary and Treasurer, P. E. Glenn, Atlanta, Ga.

In accordance with the usual custom of the association, the remaining vice-presidents and the committee members will be appointed by President-Elect W. J. Vereen, who has not as yet made his announcements. Adjournment was then taken until the call of the president and executive committee for the next regular meeting.

Shortly before the European War broke out, Messrs. G. Josephy's Erben of Bielitz (Austria) brought their carding and spinning machinery on the markets of the United States, Canada, and South America. This concern was established in 1851 and they have built many thousands of cards and spinning machines for woolen, cotton and flax mills, which are now running in every part of the world. The European war stopped importation completely, but Messrs. G. Josephy's Erben's representatives for the United States and Canada, The Lehnert Textile Co., 184 Summer Street, Boston, Mass., inform us that they are ready to talk business again, as they have established a machine shop in Roxbury, Mass., where they are manufacturing some of the Josephy machinery. The best known machine they have so far brought on the market is Josephy's Patent universal card grinder which is used in many mills in this country. Recently they have taken up a larger line of machinery and we are advised that Herman H. Lehnert, the personal representative of G. Josephy's Erben, whose likeness is shown herewith, and who has been with this concern for the past nine years, intends to visit the South during July and August in order to introduce the Josephy machinery and establish new agencies in this Southern district.

"He who has no clear inherent right to live somewhere has no right to live at all."

Southern Textile Association Convention

The annual convention of the Southern Textile Association was held at Asheville, N. C., on Friday and Saturday, June 16th and 17th, with approximately 150 active and associate members in attendance. The frequent showers which featured the convention days as well as several days preceding the convention had placed the roads in rather a bad condition for those who motored to Asheville to attend the meeting, and many stories were current around the hotel lobby as to how this or that party succeeded in extracting its car from some of the various mud holes into which they had bogged while enroute to the convention. However, the interest and enthusiasm of those present kept things moving at a very lively rate.

First Session.

The first session was called to order Friday morning at a little after 11 o'clock by President Sherard by introducing Judge P. C. Cocke of Asheville, who welcomed the delegates on behalf of Mayor J. E. Rankin. Senator A. M. Dixon of Gastonia responded to the address of welcome on behalf of the association and said the reason the association came to Asheville was on account of the splendid time the delegates had while there. N. Buckner, secretary of the Asheville Board of Trade, then spoke briefly and expressed the appreciation of that organization with its membership of 600 men because of the decision to hold the convention in Asheville. Then came the

President's Address

by President Sherard of the association, who said, in part:

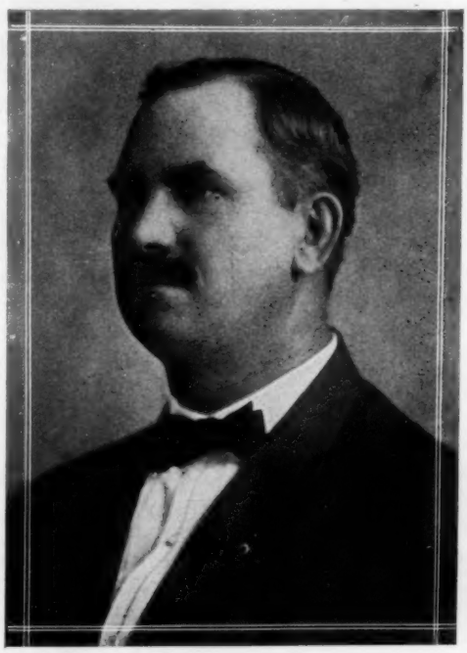
Our mid-year meeting comes at a time when the members of the association might pardonably feel more disposed to play than to work, and especially does this apply to this splendid mountain retreat and playground of America, but I am glad to note, in spite of the natural temptation, a spirit of enthusiasm for the serious side and purposes of our organization and an evident desire to make this meeting a new milestone in the progress of the Southern Textile Association.

I am sure that you will agree with me that our meeting in Greenville last November marked an epoch in the association's history.

The Greenville meeting was notable for the Southern Textile Exposition, which was held at the same time and under the auspices of the association. This is the first time such a comprehensive collection of textile products and textile machinery, and of the varied interests more or less closely bound up with textile manufacturing has been brought together in the South. The effect was an eye-opener to all of us.

I wish it had been within the power of every mill worker in the South to see this great display. It was a practical education in itself, and I am confident that every person who studied the exhibits in an appreciative frame of mind went away feeling himself a better and more competent man at his post of duty. There is nothing that inspires a desire to turn out a better product than to see actual examples of what others are doing so well, and at this exposition hundreds of experienced and successful mill men doubtless went to their homes more deeply determined than ever to become top-notchers in their respective lines of work.

Since our last meeting there have been in some states changes in the laws regulating the hours of labor for children in textile plants, and, if present tendencies continue, it will not be long before the age limit is raised everywhere by state and federal action. Without at this time entering into a discussion of this problem as it applies to actual conditions existing in many mill communities, there is one question arising out of it of vital importance to the development of community life in the mills, which ought to be discussed freely here and which ought to have the cordial endorsement of this body. I refer to the need of better educational facilities by means of compulsory attendance school laws. As the age limit for children is gradually increased in manufacturing plants, the problem of properly training the children for life's duties and responsibilities



RETIRING PRESIDENT W. M. SHERARD.

becomes in one sense easier and in another sense more difficult and complicated. It is easier in those communities where workable compulsory school laws are in force and where every child is in school. It is attended by many difficulties in those communities with slipshod school laws which permit the idle child to roam the hills or walk the streets in all the abandon of a wild and unbridled colt.

Every mill man worthy of his calling is striving to help his people and to build up his community. There are many agencies at his command with which he must labor for improvement, in season and out of season, but I know of none that offer greater possibilities than a well equipped school house filled with boys and girls eager for an education. There is no disguising the fact—and it is a condition that applies to rural and city communities as well as to our mills—that many parents will not send their children to school unless they are required to do so by the state. A parent who would wilfully stand by and allow his child to remain out of school and grow up in idleness and ignorance

is on a par with the parent who would deny to his child bread for its mouth or warm clothing for its back. It is trite to argue that the parent owes to his child the duty of training him up so as to make him an efficient unit of society; it is wasting words to declare that the parent ought to keep the child in school as long as the child is barred from employment by the laws of the land, or longer if he is able. We concede these things without argument, but we do not always stir ourselves to the point of applying the remedy.

It occurs to me that if this association would agree to put on a campaign of education, in a sincere and wholehearted manner, having for its object the enrolling of every child in a school conducted by competent teachers, and, if this movement could be carried on successfully for ten years without an abatement of the enthusiasm and work necessary to make it go, the average community would be almost revolutionized at the end of the period. The only way to get this result is by compulsory educational laws that are framed to be enforced and not merely to hang on the walls as legislative ornaments. In school, the child is learning habits of mind that develop character; out of school, and in idleness, he is forming habits of mind that undermine character.

An education for every child means two certain, definite results: first, greater efficiency as a laborer, thus increasing his own happiness and prosperity and that of his employer; second, a higher type of man, thus raising the standard of citizenship by lowering the percentage of wrongful and criminal acts that spring so generally from ignorance.

The weapon we need to strike down the twin curse of illiteracy and vice lies within easy reach of our hands. Will we be bold enough to buckle on our armor and go into the fight and use it?

In this connection, too, I would emphasize the value, from an economic as well as from a moral standpoint, of clean and wholesome living. A community can be no better than the average of its citizenship. It is a law of physics that oil and water will not mix, but in human society the law is reversed. The mixing process is going on all the time to the vast injury of the good type of citizen. The oil of sturdy worth and character is weakened and adulterated by the poisoned waters of ignorance and vice and prejudice. The bad citizen is sometimes improved by being brought into contact with a better man than himself, but in the majority of cases the higher type is pulled down to the level of the lower and the result to the community is injurious. One way to get rid of the man whose presence in the community is a menace to its peace and safety is to let him go. But when he goes he is sure to drift into some other community where his presence will be just as great a menace to the people, and thus he goes on and on, driven from pillar to post, leaving behind him an unbroken trail of evil influence. Now, it is almost impossible to cure a parasite of this type, and it does little good, except to the community that is rid of his obnoxious presence, to send him adrift.

The remedy must go to the root of the matter. When the human body is suffering from a cancerous growth that drains its strength and threatens its life, the surgeon's knife must be applied and the affected tissues removed. In the same manner, when there is an evil growth in the body of society—and no community is free from such blight—the knife of popular education and of right and wholesome and clean methods of living must be promptly applied. Only in this way will we be able to produce a community life free of the drones and parasites who feed upon it and sap its vitality, and only in this way will we be able to build a vigorous community blessed with men and women, with boys and girls, who are trained to be builders and not destroyers. To be rid of one type, we must start at the foundation and build up another type to take its place.

As some of the speakers on the Friday programme had failed to arrive because of a delay in the train service, President Sherard called upon Superintendent F. Gordon Cobb of the Inman (S. C.) Mills, who made a very interesting talk on

Progress in Management.

In the course of this practical talk Mr. Cobb said:

The progress of time has made many changes in the requisites necessary to make a successful cotton mill overseer. Not many years ago the most efficient overseer was the man who best understood the workings of the machines in his department. But with the introduction of automatic machinery many men became overseers because they understood the automatic machinery and were able to keep it in first-class shape.

The efficiency engineer of today is participating largely in the directing of human affairs. In the large groups of men employed by operating, manufacturing, and construction companies the individuals have to be organized and taught the most efficient ways to reach a common goal. Also the different groups in an industry are becoming specialized, so that organizing powers are necessary to keep their interests bound together. Where once the engineer's work was confined to the materials of nature, now it comprises as well the actions and characteristics of human nature.

The work of the cotton mill overseer of today has taken on practically the same changes as those of the engineer. We soon began to realize that when our machines were in first-class condition, that something else must be done or we were at a standstill. Then we began to find out that there was an unlimited field for progress in the improvement of the human element. This in reality proved to be a fortunate coincidence for both the overseer and the operative. Because we found out that as we were able to teach the operative to be more efficient in his work, to expend the same amount of energy to produce more product; individually the operative derived more benefit from the new methods than the overseer did. The more intelligent class of operatives gladly accepted these teachings and readily cooperated with us because it was no trouble for him to see the benefit he was deriving by the increase in his pay envelope. Thus human nature (the greatest of all studies) and efficiency methods entirely superseded the study of machinery operation.

Of course, it is still necessary that an overseer should understand thoroughly the best settings, speeds, etc., for his machines, but the point I wish to bring out is that the overseer must specialize, now more than ever, on the human element as an instructor in the operation of the machines by the operative. The one possible exception to this reasoning is in the carding department. First, because that department has few operatives in comparison with the other departments, but more especially because the carding lays the

foundation, so to speak, that determines materially the success of the spinning and weaving. The settings, drafts and speeds of the pickers, cards and drawings can so easily change the running of the balance of the machinery in the mill for bad or worse, it is probably best that a carder should specialize more in the study of his machines than in any other department.

To illustrate: I once saw a carder take charge of a room and in a short while the work in the spinning room was running better. Spinners began to ask for more sides, they did not have to clean the guide boards so often and it was no trouble for any one to see that there was less fly in the spinning room as well as on the speeders, intermediates and slubbers. When I started to hunt for the cause of this improvement I found he had not changed but one setting in the card room, and that was at the licker-in on the cards.

Many more instances could be cited. Local conditions many times determine the settings necessary for the best results in a mill. It is almost an exception to the rule to find a mill that is operating on the style of goods it was designated for and in changing the style of goods a machine or two has been added to one process to balance it with the new requirements, and another process has been strained because of lack of space for more machines or because the management did not see the need of them anyway, with the sad result that the work is running badly and could be greatly improved by a careful study of local conditions and a few little changes in the machines. Such conditions are more often found in the carding department.

Getting back now to the original thought of this article, let us emphasize the fact that the individual is no longer a "Jack of all trades"; he is a specialist. The very fact that all manufacturing is done on so much larger scale than formerly has created a demand for the specialist that cannot well be supplied. So far machinery output has been greatly increased and seemingly so near perfection that the wide field of creative output of human machinery easily affords the quickest method of further improvement.

This process means a study of human nature and the motives that influence the minds of men. Men are not duplicates by any means, which, of course, makes the problem greater because a study must be made of the individual. This brings out the fact that the more intelligent an operative is, the easier the overseer will be able to point out to him the wisdom of making a systematic study of his work in order to increase his production for the benefit of his own pocketbook.

Operatives are fast finding out that running a set of looms is not merely the process of supplying filling and drawing in a thread, but that there is vastly more to be learned about ways to increase the production of those looms than merely working fast. It is so easy for us to think we are already doing everything that can be done. However, we are only getting a good start and it is up to every overseer and superintendent to concentrate on the human element and find ways or methods by which we can enlighten the operative to the fact that his pocketbook will be benefited by accepting our teachings.

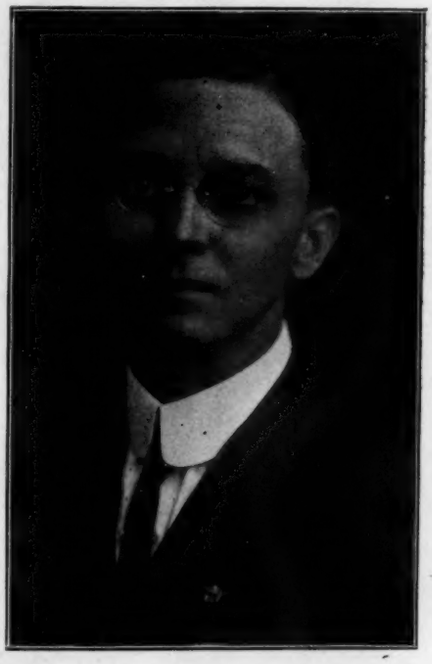
As Mr. Cobb concluded, a resolution was offered to amend the by-laws so as to dispense with the semi-annual meeting of the association which is held every year in November, concentrating the attention on the June meeting each year. This resolution was tabled by an overwhelming majority.

The next subject to be discussed was the place of meeting for the November convention, and invitations were read by the secretary, the association voting unanimously to go to Columbia, S. C. After the appointing of various committees by the president the Friday session adjourned.

Friday afternoon many of the delegates enjoyed the trip over the Biltmore estate and Friday night they were tended a very enjoyable smoker and dance on the roof garden of the Langren Hotel, donated by the hotel management. This was largely attended, practically every delegate being present.

The Saturday Morning Session

was called to order about 10:30 o'clock, when President



F. GORDON COBB, CHAIRMAN OF THE BOARD OF GOVERNORS.

Sherard introduced President W. Champlin Robinson, of Wm. C. Robinson & Sons Co., of Baltimore, Md., who delivered an interesting address on "Petroleum, Its Manufacture and Use." Mr. Robinson was thoroughly at home with his subject and sketched the history of petroleum since the dawn of civilization. He then took up the subject of drilling for petroleum and described how the wells were drilled, the product secured from these wells, how this product is transported from the wells to the refineries, the various methods used to refine the oil and secure from it its various distillates, and finally the various processes utilized to filter, bleach, or otherwise clean the oil and prepare it for use as a lubricant.

The next paper on the programme was an address on

Industrial Management in Textile Plants

by Walter C. Taylor of Bridgeport, Conn. Mr. Taylor had a large subject, and his address covered a wide range. His talk received careful attention on the part of the delegates, and is in part as follows:

As a definition of my subject I know of no better way of defining it than to say Industrial Management is the art of securing the most out of business at the least cost or increasing production and decreasing cost.

SOME OF THE DELEGATES ON THE ROOF GARDEN AT THE LANGREN HOTEL.

Considering any kind of a plant, its fundamental principles are the same, regardless of the nature of the product. All are in business to make money and make money as cheaply as possible.

It is strange that any business that can produce a saving by installing a system of non-leakage of profits does not receive such a method with open arms, but they do not. The chief objection being that the management has the idea that everything worthy of note is being considered, possibly so, but from the results that have been produced in plants that have removed their false pride, conditions have been found otherwise.

In comparison with the number of manufacturing plants that have gone through a systematizing process, the percentage of textile plants to install such methods is very small. When you consider the enormous capital invested in cotton manufacturing, in comparison with the amount of money spent to protect and realize on the investment, the sum is of minute size. Do not misconstrue my statement. I do not mean cotton mills under pay, but the consideration given to some item that should be converted into profit is so small it is really hard to express.

Industrial management in textile plants has not progressed as rapidly as it has in other industries, principally because the majority of engineers practicing this work were educated in the mechanical field, however in the past five years realizing the field in the textile industry, more and more of the engineers have been soliciting textile work.

"As the proof of the pudding is in the eating," so are the results of industrial management in the installing. Every plant that has engaged in this work has been benefited and the results are permanent. If you care to be burdened with a lot of figures, I could sight many an instance in my own experience where results were obtained that would appear preposterous, but figures do not lie, and the results speak for themselves. The question that is before you gentlemen is, how are these results obtained?

By organization, production, costs and records. These four factors, like the legs of a chair, are what industrial management depends upon for its support. These supports are of sufficient size to be treated separately, and the first is organization. In any business that has passed the one man stage there must be an organization, whether it consists of three men or three thousand, it is as necessary as the machinery in the mill. Organization is the human machine that generates the co-operation, that is absolutely necessary to the running of the plant successfully. Where a number of men are associated having the same general good in sight there must be a guiding hand to steer and create the team work necessary to run.

With the organization as the keystone of the mill, and supported on a solid concrete foundation of co-operation, we are ready for the job, regardless of what it is or how large. The job in this instance is production. Production is the second of our factors. It can be secured by putting the machinery and operators at work and letting them go. Production under industrial management consists of securing the greatest possible production and securing it by standardizing, planning, scheduling and maintenance.

What are standards? They are an obtainable production, set by making a careful analysis of the machines and operators. H. C. Raynes, my former chief, makes the statement that by carefully setting standards, it is possible to compare any two departments of the mill or any two mills. When you state your room or mill is operating at 90 per cent efficiency, what do you mean? Do you refer to the ratio of your production to the production set by the machinery builder? You should refer to a standard set in your mill, regardless of any other data. All information in setting an obtainable production should be worked out in detail, taking into consideration speed, general condition of the machine, and last, but not least, the human element.

The standard set as an obtainable production and your efficiency is 90 per cent you are then in a position to know accurately your room or mill is losing 10 per cent production, through some fault that should be overcome.

With standards as a basis upon which to work the office is in better shape to contemplate the needs of the mill and closing of orders. In computing costs, standards are very necessary, as the costs are worked on a standard production

and any decrease in production increases the cost. Standards are also very necessary to planning and scheduling the work through the mill.

In setting standards you should know everything possible about the machine or operator. For illustration: assume we are getting a standard for a speeder in the card room and are making 4-60 hank roving. The speeder is carefully gone over and put in the best possible condition, an average speeder tender is selected as operator. The observer or time study man gets ready and the analysis starts. The hank clock is read, speed of front roll secured, size of gears and other necessary data regarding the machine. Every break-down or stop is noted; the time to doff for tender alone and with help is noted. In fact every occurrence is taken into consideration. At the close of the test the hank clock is read and result computed on a pound per spindle week basis. This is the actual production. The theoretical production is then computed which for a 54-hour week we will assume is 10.964 pounds per spindle week. Allowances must be made in order that standards may be reached. The allowances are for the average mill about as follows: Doffing, 3 per cent of running time; changing and repairs, 75/100 of one per cent; non-producing bobbins, ½ of one per cent; stops, broken ends, etc., 2 per cent., making a total of 6¼ per cent that must be deducted from the theoretical production to secure our standard, which is 10.1788 pounds per spindle week.

Should the superintendent, with our standard established, ask how the card room made out last week, the reply would be: "We ran 95 per cent. to standard." And the superintendent would know the room was 5 per cent. off in production—production that could be obtained.

Having set standards for our mill, the next factor of production is planning. The methods so often used of putting a piece of work or cotton in a mill are gradually passing. The architect does not build you a home before planning, and so industrial management does not make yarn or cloth before planning.

Planning and scheduling the work, places the mill in a position to eliminate idle machinery, thus reducing cost, as non-producing machines are the best of profit eaters. Not only is the mill benefited, but the operator as well, as the weaver is not often paid for idle machines. One of the largest textile plants of New England has its planning and scheduling done to such a point that every man knows exactly when to move. The various departments all plan and schedule their work to reach its destination at the proper time. The results are, as previously stated, production is at the maximum and idle machinery at a minimum.

Another necessary feature in production is maintenance. Keep all machinery in excellent running order. This can only be accomplished by a thorough examination of the equipment and putting it in excellent running shape. Without the proper repairs and supplies production will not be at its best. Idle machinery will again gnaw into the profits.

Speeds should have the careful consideration of the maintenance department; machines running at a speed less than standard forms another outlet for the loss of production and profit. Bringing of speeds of spinning frames to a constant quantity resulted in an increase of 6 per cent. in production.

A factor of the plant that plays a very important part in industrial management is the costing of the product. Accurate costs are necessary; hard to secure, perhaps, but the work is made easier and more accurate if the mill has been standardized.

A brief outline of such a method of costing is to consider the departments of the mill as entirely separate organizations, each having its proportion of the general expenses of the plant. A number of ways of distributing these charges are in vogue, but one of the simplest is to assume that each department bears the same proportion of general expenses as it does floor space to the entire plant.

In handling our first three factors—organization, production and costs—it is perfectly obvious that some arrangement must be made to care for and preserve the data. This necessitates our fourth factor—records.

Records relieve a man's mind of a lot of things that he has to call into play occasionally and the chances for

error in expressing is eliminated. None of us trust to memory the pay roll; the production figures are equally as important. Of course records can be carried too far, but as previously stated anything worth knowing regarding the plant is worthy of a record.

Superintendent J. M. Davis of the Newberry (S. C.) Cotton Mills, was the next speaker on the program, and the subject was

Child Labor Legislation.

It will be remembered that Mr. Davis is the man who made such a very forcible talk before the Senate Interstate Commerce Committee against the National Child Labor Bill and who created such a favorable impression on the Senators comprising that committee because he spoke, not alone from the standpoint of a manufacturer, but also from the standpoint of a man who has worked up through the mill since his boyhood days when he began in the mill as a sweeper boy. The larger part of the address of Mr. Davis follows:

Before I enter upon the discussion of the subject assigned to me, I want to say that I am sorry that I haven't a paper prepared at this time on "Condition and Treatment of Children in the Southern Cotton Mills." As I have been listening to the addresses which preceded mine, it has occurred to me that this is a mighty fine time to set forth before the law makers of our country the condition under which our children are being treated and reared. I have confined myself in this paper, of course, to the subject to which I was assigned, but I want to say that the condition of the cotton mill children is not as bad as it has been represented in both the state and national law making bodies. We have been grossly misrepresented, and we have some fine illustrations of the work which can be accomplished and is being accomplished by the children coming from the mills.

The young man who won the contest in oratory at Greenwood, South Carolina, from among all of the colleges in South Carolina is now weaving in my mill. He not only won the contest at Greenwood over all the others, but he finished his college career with a record not only exceeding all of the students of 1916, but the president of the college at Newberry told me that his record was superior to any student in the history of the college—sixty years. This is not an isolated case.

We have another young man who graduated at the same time. There were five medals given away at the college commencemnt. Four of these medals were won by these two young men from the mill district and one went to the city. You know the reason for this? It is because a young man or a young woman who has to struggle for what they get, who are placed in circumstances where it is necessary for them to study, will always rise above and be superior in knowledge to those who know that they do not have to work when they get through. My mill is not an isolated exception. They are all over the southland. There are bright minds coming from the mills, and I call your attention to the fact that these young men referred to are not children; they began years ago. We have better conditions today than we had 15 years ago when these young men started out to get an education. Just think of the marvelous change that has taken place in the last 10 or 15 years, and if this is a fact that these young men are coming out with such high honors, under conditions vastly inferior to the conditions of today, what may we expect of our children, the young men and young women coming out from the cotton mill villages ten years hence? We have nothing to be ashamed of in the condition and treatment of children connected with southern mills.

The subject assigned me for discussion is one in which I have been profoundly interested for a number of years, and I have naturally given it the most careful consideration of which I was capable. What I shall say, however, in the brief time allotted me, will be based not so much upon what I have read on the subject as it will be upon my own personal observation. Some great and clear minds have approached a solution of our question, while other men, wise maybe in some lines of thought, have lost themselves in a wilderness of confused ideas when they take up "Child Labor Legislation."

Of course, in such an audience as this there is no one who does not readily realize that the prosperity of our country and the integrity of the nation will in a few years rest upon the boys and girls of today. We hear this so often that the mere repetition of the thought sounds commonplace to us; and yet, gentlemen, it is freighted through with a sacred truth. And the sacredness of this truth, Mr. President, is as dear to the hearts of the men at the head of our great cotton industries as it is to the hearts of any other class of men on God's green earth. If I can, I want to clear the atmosphere in the outset of the impression that the management of our cotton mills is essentially the enemy of the children. Some people seem to think of us as a great dragon that annually requires the sacrifice of hundreds of tender boys and girls. We, together with all true forward looking men, desire to see the younger generation develop into citizens of lofty ideals, with well trained minds and strong bodies, and able, when duty or opportunities offer, to fill places of honor and responsibility in the industrial life of our nation.

This ideal condition can only be reached by the sane and honest thought of all of our best men united upon this one supreme task; and it will never be reached by the ill-advised and slipshod legislation of men essentially ignorant of the ills they would cure, and who are more interested in the retention of their office than they are in the permanent good of any legislation. Those who would contribute to the solution of the subject must approach it in the light of generations and not as if it could be solved by some two-by-four politician in some law-making body. Very little of the legislation thus far on this question has materially affected the welfare of the children—though many of the states have laws of some kind or another.

I was interested in reading the story of ancient Greece, a few days ago. I find that Greece, long before the imperial city of Rome was even thought of, had her childrens' problem. The two leading cities of this wonderful people dealt with this question in exactly opposite ways.

Sparta took the child from the parents at the age of seven and made him the ward or child of the state. The parent had nothing more to do with the child. He, henceforth, owed everything to the state. Athens, on the other hand, left the child in the care of the parent. She conceded the mutual duty and obligation of parent and child, and aided both. The wisdom of this latter course has stood the test of future ages; and Athens, the home of philosophy, art and poetry, was wiser in nothing than in aiding rather than

dogmatically dictating to the parent what his child should and should not do.

There are four requisites in the development of an ideal citizen: first, a strong and healthy body; second, genuine moral training which imbues the possessor with a high conception of honor and fair dealing with his fellows; third, a well trained mind—enabling one to weigh well all sides of every proposition; and, fourth, an industrial training which teaches him the science of his particular vocation. Some of the great nations of the world today have advanced further in one or the other of these four phases of training than our own nation; but no one of them has so united them all or carried them to so high a degree of development as has our own country. We, in this country, consider

VICE-PRESIDENT J. M. DAVIS.

each of these important in a well-rounded citizenship.

If we consider these requisites concretely and apply them in our own line of industry to the children that are in a measure intrusted to our care, we find a nation-wide interest in the development of the child along all lines by men and women of means and by large corporations. States have passed laws affecting the employment of children in mills, until at present very few states will allow children to be employed under fourteen years of age.

In this matter of legislation, the thing I wish to call special attention to is the gross misrepresentation of conditions in the mills and villages. Irresponsible agitation has also had its effect. A bill is now before the United States Senate to prevent all children under fourteen years of age from working and those under sixteen years from working more than eight hours per day. I believe a great many of our law makers are honest and sincerely desire to support measures which they consider best for the child and the country—but the average politician, both state and national, cares very little for the merits or demerits of a bill or for the child and family it may affect. If the bill is for the time popular and if by supporting it the politician can retains his office, he is ready to give it his "unqualified support."

The things that have hindered a proper solution of the question thus far has been the paid hireling who misrepresents conditions at the mills and the small politician, who, by loud words and leather-lunged speeches, proclaims in glowing terms the oppressed condition of the poor little factory child, and proceeds to help it by the enactment of laws which take from it its daily bread.

We concede the right of a sovereign state to enact laws for the protection of our people and the development of her citizenship; but we do question the wisdom of negative laws which forbid the child to work without any provision for those who by some misfortune are more or less dependent upon their children for support, and, further still, to deny them the right to work without proper provision for their educational advancement.

The questions that come to every thinking man and woman are: Is the type of child labor legislation we have necessary? Or is it helpful? Or, again, do these laws aid in the development of the child into a well rounded citizen? If these questions cannot be answered in the affirmative, then such legislation most certainly has no place on our statute books.

PRESIDENT-ELECT FRANK E. HEYMER.

The idealist and the dreamer has the impression that the enactment of negative laws such as most states have now will transform the children into healthy and well trained citizens. How may we hope for such splendid results when, under the law, the children are simply turned upon the streets without provision for training them? The proverb, "An idle brain is the Devil's workshop," applies no more to the father than to the son, no more to the mother than to the daughter.

It seems to me that we would be attacking the question from the right angle, if, instead of a child labor law, we had a compulsory education law. I take the position that the state should provide facilities for training the child, and then by law force the child into these training schools. This would develop them into useful citizens. But, at the same time, a way should be found by which the state might

be able to render aid to those in actual need of the child's labor for support.

If the state is not prepared to take care of the children under fourteen years of age, then it has no moral right and should be unwilling to turn them upon the streets in idleness to become moral degenerates and a menace to the commonwealth.

Another brazen defect of these child labor laws is that they do not affect all children alike. A large part of our child population is lost sight of in this beneficent legislation. The little fellow twelve years of age may still be required to deliver papers in order to support his parents or to earn change for himself. Again, he may be required to work in hotels, in stores, or even as a messenger in legislative halls where bills are passed against child labor. I will not undertake to enumerate all the various kinds of work children may be allowed to do under this so-called child labor law. I merely take time here to call attention to its shameless one-sidedness. Are not the children connected with all this different work worthy of the succor of our law makers? Oh, they will tell you the mill is unhealthy and the children otherwise engaged may get fresh air. They specially stress the fact that poor children in the country who are compelled to aid in making a living can get fresh air, but too often is it the case with children of poor farm tenants that fresh air is nearly all they do get. Many of you gentlemen came from the farm and you are familiar with the fact that the poor country family is living under the most unsanitary and therefore the most unhealthful conditions. Many of them live in houses of not more than two rooms, with small openings in the walls for windows. These windows are insufficient in both size and number. The water is from an old surface well that possibly has not been cleaned out for years. The only bath room is the nearby branch, and it is safe to assume that it is used only during the few hot months of the mid-summer.

Yet, so far as the law is concerned, the children of these families may begin at any age, and in many instances not later than ten years, and work twelve hours per day for the entire year. Our law makers simply term them the "backbone of the nation" and commend their labor. But let one of these families move to a mill and in the eyes of our wise law-makers these children have at once assumed a mythical sacredness and are the special recipients of child legislation. The further the question is analyzed, the bigger farce it seems to be.

Especially does the incorrectness of all the arguments about health and fresh air seem to become plain when it is pointed out that most of the mills of today are doing so much to safeguard the health of all their employees. Our mills are well ventilated and are equipped with the best scientific humidifiers. Germs are kept down by means of powerful disinfectants.

The child's welfare has been looked after and safeguarded by means of large expenditures of money by the mill managements. Today may be seen in any up-to-date mill village ball parks, flower gardens, playgrounds, swimming pools with hot, cold or tempered water, good schools with both day and night classes, reading rooms, libraries, music clubs, debating societies and regular Sunday religious service. These are not mere word pictures. They are facts —facts we have worked out in our own mill, and I know of them in many other mills in our state and neighboring states.

To sum up, then, it seems safe to conclude that the real friends of the children of the mills of the South are not the ill-advised and loose-thinking politicians, but the management of our mills; for our destinies are "one and inseparable, now and forever."

Following this address a motion was made to thank Mr. Davis for his address and also for the evidence he gave before the United States Senate Committee on the Keating-Owen bill, and it was also voted that the address of Mr. Davis be printed in full and copies sent to all senators and members of Congress, as well as the Governors of the various southern states.

Although Captain Harry P. Meikleham, of the Massachusetts Mills In Georgia, was on the program for a paper on welding, urgent business in the North prevented his being present, and this address was dispensed with. However, President Sherard announced that E. M. Terryberry, of Charlotte, wished to address the delegates, and called Mr. Terryberry to the platform, where he demonstrated his ability as an orator and kept the delegates in an uproar of laughter for several minutes.

The next feature of the program was the election of officers, and the result of this election was as follows:

President, Frank E. Heymer, Alexander City, Ala.;
Vice-President, J. M. Davis, Newberry, S. C.;
Secretary, A. B. Carter, Greenville, S. C.
Treasurer, Marshall Dilling, Siluria, Ala.;
Chairman of the Board of Governors, F. Gordon Cobb, Inman, S. C.

Four members of the Board of Governors were also elected as follows:

J. W. Cates, East Durham, N. C.;
J. E. Sirrine, Greenville, S. C.;
J. M. Alexander, Pelzer, S. C.;
J. A. Greer, Greenville, S. C.

The formal meeting then adjourned to reconvene in Columbia, S. C., at a date to be announced later.

A number of exhibits occupied the lobby floor at the hotel, among which were a stationery platform scale and a hanging picker lap scale being demonstrated by O. E. Schupp of Atlanta, the district manager in the southern states for the Toledo Scale Company of Toledo, Ohio, assisted by two salesmen from the Carolina territory; Leon L. Wolf of the Leon L. Wolf Paint Co., Cincinnati, demonstrating Wolf's Elastine Lacquer by immensing it in boiling water and other liquids; Philip C. Leffel of the Cincinnati Wire Bound Box Co., with a line of packing cases, and Daniel Line, of the Fairbanks Company, with platform and bathroom scales. The Normalair Company of Winston-Salem, N. C., were represented by the Charlotte manager, J. D. Smith, who had a humidifier in operation.

"Graphite for Cylinder Lubrication" is the title of a new booklet just issued by the Joseph Dixon Crucible Co., Jersey City, N. J. It tells of graphite lubrication for steam and gas engine cylinders and gives concise facts about lubricators that are made to use graphite alone or graphite with oil.

Mill Conditions and Market Reviews.

Southern Mill Situation.

Speaking metaphorically, southern mill men are saying little and sawing wood. A strenuous effort is being made by practically all concerned to secure a record production, while the buyers still have their voracious appetite for all kinds of cotton textiles. The consumption of cotton by southern mills still continues high; prices in practically all lines are satisfactory, both cloths and yarns in many instances commanding top prices.

A great deal of interest is being manifested in mill circles, through the action brought by separate groups of minority stockholders in the Parker Cotton Mills Co., primarily intended to block the sale of the Hampton Cotton Mills group of the Parker combination to Lockwood, Greene & Co., for a sum approximating 2½ million dollars. The first of these cases was pleading for a permanent restraining order to prevent the consummation of this sale and was the result of a temporary order issued by Justice Watts returnable before Judge T. J. Maudlin on Tuesday, June 20th. After the hearing Judge Maudlin declined to grant the permanent restraining order, as there was no evidence of constructive fraud, or gross inadequacy in price. Justice Watts later issued an order of supersedeas which indefinately stays the order of Judge Maudlin until acted upon by the state supreme court.

Another group of minority stockholders began proceedings in the Federal Court, not only asking that the officers be restrained from making the sale of the Hampton Mills group, but also asking that receivers be appointed for the Parker Cotton Mills Co. Judge Joseph T. Johnson issued a restraining order on Thursday, June 15th, together with a rule to show cause returnable before him at chambers in Greenville on June 24th. He, also, granted an order of supersedeas and this section of the case will now go to the U. S. circuit court of appeals at Richmond, Va. The order provided, however, that the sale could be consummated if the defendants filed a bond of $100,000 to protect the plaintiffs.

Another group of mills in South Carolina that have had financial difficulties are those of the Graniteville Manufacturing Co., at Graniteville. Considerable bitterness was aroused at the time the receivers were appointed on this property, the opinion being frankly expressed by some interests and certain trade journals that it would have been a better plan to have turned the mill over to the creditors for operation without a receivership. However, under the able management of the receivers, Jacob Phinizy and R. G. Rhett, and their superintendent in charge, Frank W. Gurry, the mills are decidedly making good at the present time, and those familiar with the conditions express the belief that if the court sees fit to extend the receivership, which is returnable the 20th of next September, it is probable that the receivers will be enabled to pay off the larger part of the indebtedness of these mills during the next two years, when they could again turn the mills over to the stockholders either clear of debt, or with a comparatively small balance due.

P. J. McNamara, Receiver for the Lang Manufacturing Co., West Point, Ga., has announced that the property of this company will be sold at public outcry at the property on Wednesday, July 12th.

The Opelika (Ala.) Cotton Mills will install a new yarn press and a new waste press. This equipment has been ordered from the Economy Baler Co.

The Pearl Mills at Durham, N. C., have recently installed two Whitin spinning frames.

The Anchor Duck Mills at Rome, Ga., have adopted Stevens' cans for their mill village. Largely as a result of this installation, the city of Rome has contracted for 1,000 Stevens' sanitary cans, and has passed an ordinance requiring their use on surface closets throughout the entire city.

The Patterson Mills Co., at Rosemary, N. C., have contracted for 7,000 additional spindles and 280 looms with the other necessary preparatory machinery.

The Selma (N. C.) Cotton Mills have recently placed a contract with the Normalair Co., at Winston-Salem, N. C., for an equipment of Normalair humidifyers.

The Meritas Mills at Columbus, Ga., which was recently noted as enlarging its main plant, has also recently contracted for the erection of two additional warehouses for cotton storage, one four stories and the other five stories in height.

The Alabama Power Co. has recently closed a contract with the Highland City Mills, The Chinnabee Cotton Mills and the Hicks Hosiery Mills at Talladega, Ala., to furnish them with electric power for the entire operation of these plants.

The Gaffney Manufacturing Co., at Gaffney, S. C., have installed some additional Draper looms.

The new Spencer Mills at Rutherfordton, N. C., which were mentioned last month, have awarded the contracts for the building and machinery. The building will be of brick, 310x80 feet, and when completed will contain 5440 producing spindles and 3168 twister spindles.

The Richmond Hosiery Mills at Rossville, Ga., have recently installed a Stock press purchased from the Economy Baler Co.

The Columbia Cotton Mills, Columbia, S. C., recently installed 300 Stevens' cans in the mill village.

The Adrian Manufacturing Co., at Mount Holley, N. C., the organization of which was noted in these columns some months ago, will build a mill building two stories high, 310x78 feet, which will contain 17,056 producing spindles with the accompanying preparatory machinery for the production of 60's to 80's combed yarns. The machinery equipment for this mill was furnished by the Whitin Machine Works. The humidifying system is a Cramer, and the mill will operate by electric power. C. E. Hutchison is president and treasurer.

Construction has begun on Mill No. 2 of the Fort Mill Manufacturing Co., at Fort Mill, S. C., The Fiske-Carter Construction Co., of Greenville, S. C., having the contract.

Three hundred and eighty-two Draper looms have been ordered by the Martel Manufacturing Co., of Egan, Ga.,

and will be installed in a new one-story 90x75 ft. weave shed which is being built. A number of old looms are being discarded.

The Barrow County Cotton Mills at Winder, Ga., recently installed a new waste press made by the Economy Baler Co. The King Cotton Mills Corporation, of Burlington, N. C., and the Sutherland Manufacturing Co., of Augusta, Ga., have also ordered waste presses from this company.

The Lanett Bleachery and Dye Works is to be extensively altered and repaired. It is rumored that their dyeing end will be rearranged with a concrete floor for the dye house, and a large order for new machinery has been placed.

A number of Stevens' sanitary cans have been placed recently, the following southern mills securing equipments as indicated: The Springstein Mills at Chester, S. C., 80; the Beck Manufacturing Co., Warrenton, N. C., have equipped their entire mill village; the Walton Cotton Mills at Monroe, Ga., have installed 136 in their surface closets; and the L. Banks Holt Manufacturing Co., at Graham, N. C., are engaged at present in installing this equipment throughout the entire mill village.

The new plant of the Chattanooga (Tenn.) Aseptic Cotton Co. is nearly completed, and it will probably be ready to start this month. This plant will have a capacity of 20,000 pounds of bleached cotton daily. All machines are motor driven.

The Republic Cotton Mills at Great Falls, S. C., are progressing rapidly with the addition previously outlined and have just completed between sixty and seventy houses for operatives.

The Lumberton (N. C.) Cotton Mills have contracted for twisters necessary to handle the products of 5,000 spinning spindles. This will form the equipment for the new addition recently built.

The Norcott Cotton Mills of Concord, N. C., will install 6,000 additional spindles with accompanying machinery. Contract has been awarded for the machinery. This is one of the Johnson string of mills manufacturing hosiery yarns.

It is reported that the South Texas Cotton Mills at Brenham are operating on a schedule of twenty hours a day.

The stockholders of the Irene Mills at Gaffney, S .C., held a special meeting on June 24th to vote upon the proposition of increasing the capital stock of these mills from $50,000 to $100,000.

The Oconee Mills at Westminster, S. C., are installing forty new Draper looms.

The Spartan Mills Co., at Spartanburg, S. C., are erecting a new office building on the site of the old office building, which is now nearly completed.

The Corsicana (Tex.) Cotton Mills, who are building a large addition to the main mill, has just completed a new warehouse 84x61 feet. A similar warehouse will be added later. The product of this mill is single filling duck.

The Yadkin Bleaching Co., of Salisbury, N. C., has been recently organized by D. P. Campbell, New York; T. C. Love, Gastonia, N. C.; and N. B. McCanless and M. L. Jackson, of Salisbury. An investment of approximately $200,000 will be made for building a bleaching and mercerizing plant at Salisbury.

The Delgado Mills at Wilmington, N. C., have installed additional new machinery, including 1800 H. & B. American Machine Co. spindles and 80 Crompton & Knowles looms. It is understood that the dyeing department of this mill is also to be overhauled.

New England Mill Situation.

New business has been slow with the New England mills as a whole during the past month. There are so many unfilled orders yet on the books that the quiet has been welcomed by many manufacturers, and selling agents still feel confident that there will be plenty of business for the balance of this year, at least. The mills are running as full as labor conditions will permit. The high wages that are being paid are not increasing the efficiency of the workers. In a number of instances mills are unable to operate more than 90 per cent of their plants for the full week. Operatives are making money enough in five days to satisfy many of them and they do not hesitate to remain away from work when the mood overtakes them.

Production is being curtailed because of labor conditions and in several instances selling agents have been advised by manufacturers not to sell their plants up too close to capacity for the last quarter of the year. Unusual efforts are being made by manufacturers to keep operatives satisfied. The Fall River Iron Works Company took a vote of its operatives on Saturday, June 24, on the question of whether a vacation from June 30 to July 5 was wanted. The Pocasset Mill of Fall River has undertaken to teach its foreign born operatives how to read and write English, something unheard of before among Fall River corporations.

Occasionally something occurs to show that mill owners are still the masters of their working conditions. The Pacific Mills fought out a strike of loomfixers and finally won it. These workers are getting as high as $18 a week and sought less work at the same wages, or still higher wages for the work that was already overpaid, based upon what other mills were giving.

The New Bedford manufacturers have stood firmly together to oppose the unions in the demands made for the establishment of a standard list of prices for weaving, in accordance with a most complicated list presented by the weavers. The latter have compromised on their demands and something is now being done to adjust other and minor grievances complained of. The underlying cause of all the labor difficulties at this time is the active demand for labor for many other industries than cotton manufacturing, coupled with the restricted immigration from all countries. It does not seem probable that the labor situation will improve any, now that troubles in Mexico have come to upset working conditions further.

The colored goods mills are getting more dyes and are running more fully than they were. The Amoskeag Company hesitated a long time before paying the exorbitant prices asked for many dyestuffs and even shut down some of its large plant and worked some departments only five days a week. About the middle of the month orders for goods began coming along at the very highest prices asked for them, and it was decided to purchase dyes and keep the whole plant moving. The company has refused to put out

any goods that were not guaranteed fast as to color and by following that policy it has held the confidence of many of its customers in a marked degree.

From reports that are coming into napped goods and blanket mills, a shortage of these goods is certain to become manifest this fall. The prolonged labor troubles at the Nashua Mills restricted the output there and the sustained cool weather of this spring and the cold weather of last winter enhanced the consumption in the domestic markets. There has also been a very substantial export trade in napped goods with Canada and other countries, so that domestic jobbers cannot rely upon finding the normal surplus for re-order purposes. The jobbers who have been to the markets have all sought to place additional napped goods business.

Print cloth and convertible markets weakened during the month, but after cotton stiffened up and buyers of goods began to realize that last year's crop was abnormally small, values hardened and part of the losses in prices were recovered. The mills held firm enough as a rule, but converters and others offered goods at resale in the New York markets, depressing values on wide print cloths 3/8c a yard from the extreme high of the year. A full 1/8c recovery occurred about the 22nd inst. On fine goods lines the cool weather has delayed the normal summer distribution of printed and white wash fabrics and there has been an accumulation of heavy skirtings in white piques and similar merchandise. This latter was due in large part to the vogue of sport stripes used for skirtings, in place of the fancy fine heavy weaves.

Bleached goods have ruled firm. The activity of the bleacheries has continued unprecedented. Some of the New York bleached goods houses sold 50 per cent of their merchandise for foreign markets in May and June at full prices so that the stock conditions in first hands are very satisfactory. The call for fine white organdies continues large, but as many of these goods are made from loose warps it has not been easy to get them. Fine nainsooks, cambric muslins, and similar merchandise are in good call. The extraordinary prices asked for fine linen cambrics, an advance of 30 per cent having been made only a week ago by linen mills abroad, have tended to make fine combed yarn cloths suitable for fine handkerchiefs, very much in demand as substitutes for linens. Voiles continue to hold a strong place in the trade, some converters having ordered in lots of 30,000 pieces for deliveries beginning in September. Lawns are not so strong.

There has been more inquiry of late from converters and others for heavy qualities of very fine cottons, a return to some of the finer poplins and fine basket weaves for suitings being noted.

The Bates and Lancaster lines of dress ginghams are open for spring. Prices have not been named save to the extent that buyers are assured that values will not be above certain limits without confirmation of orders being requested. Utility dress ginghams are selling from agents' hands on the basis of 9½c, with discounts, and staple ginghams are selling at 8c. Substantial sales of staple tickings were made during the month on a basis of 15½. All of these very high prices are much above the values current in 1907 and are due solely to the extraordinary costs of colors. New England manufacturers have been assured that they can get colors if they care to pay the exorbitant prices prevailing. These assurances have come recently from German sources, and domestic color makers are also offering additional quantities if the prices asked will be paid.

It is admitted by all colored goods manufacturers that prices are on an inflated basis, but they see nothing to change the outlook so long as the European war goes on. The dyers and finishers are receiving a great many complaints from their customers because of the high prices charged for work done. In answer, the converters are told that all the large dyeing and finishing plants have all the work they can do, most of them being in the position of having gray goods in the warehouses in sufficient quantities to keep them going from 14 to 90 days in what is usually their dull periods. In a number of instances finishers are declining work offered to them because they prefer to limit their new business to their regular trade. One instance is cited where several small customers were not confident of their ability to pay the prices exacted for finishing cheap goods and they were told by the management that a place would be held for them until later in the summer. At the same time, business from other sources was declined. Concerns that can dye fast blacks on heavy cloths are getting all the work they can attend to and the printers who have indanthrene dyes in hand can exact their own prices on fine shirtings.

The large New England quilt manufacturers are overrun with orders for fall. The largest concerns have more orders booked than ever before. Some jobbers are so anxious to keep mill orders ahead that they are already offering to buy for spring delivery and some spring business on crochet quilts has been taken. A great quantity of special work on crested goods has come into the markets from foreign sources in the past six weeks, foreign steamship companies offering mills contracts for as many as 20,000 quilts at a time.

There is little to add to the story of the sold up conditions of mills making fine yarns. There are some mills that have accepted business on special spinnings at prices that seem below the market and the explanation offered is that in normal times customers of this sort are willing to pay premiums for extra fine service and should not be mulcted in a time like this when fine spinnings command almost any sort of a premium. The dividend reports of mills testify to the very unusual profits that are accruing to yarn mills. Some of the spinners have business in hand for the first six months of 1917 and those of them willing to take orders on very fine ply yarns can get all the business they can take.

The miscellaneous weaving and related industries are exceedingly busy. Braid mills, twine factories, thread mills, and many small concerns making specialties are suffering from a lack of operatives, but not from any suggestion of a lack of business.

The mill machinery concerns continue in the fullest operation possible. Domestic business is so urgent that many handsome foreign orders have to be declined. Enlargements of plants would be made if it were possible to get skilled machinists, but as the ammunition factories still draw hard on the labor supply, the cotton machinery concerns are compelled to get on with what they can get. The Draper Company has more business than it can complete in a year and the same thing is true of nearly all the other prominent concerns.

Lancashire Notes.

BY AN ENGLISH CORRESPONDENT.

The danger of a general stoppage of the mills, owing to a strike of the spinning and cardroom operatives, seems to have been averted. The Government intervened and although the trouble has not yet reached the arbitration stage it probably will do so eventually. The dispute is over an application by the spinners and cardroom operatives for a 10 per cent advance in wages. Last summer the Government arbitrators awarded these workers a 5 per cent war bonus; that is, an increase which was to be regarded as "war wages only." But the cost of living has gone up enormously since then and, in addition to that fact, the operatives claim that the employers can afford to pay at least a 10 per cent advance. The employers took the view that the award of last summer prohibited the operatives from claiming a further advance during the war, but on this point the Chief Industrial Commissioner (Sir George Askwith) ruled against them and they have now agreed to consider the unions' application, the unions on their part postponing the handing in of notices and post-dating those notices which had already been served. The employers admit that margins are now good, but point to the increased cost of stores; in fact, of almost everything used in a mill. The real test of prosperity, of course, is the profits that are being made, and there is no doubt whatever that the spinning trade, as a whole, is doing remarkably well. The returns for the past quarter show that there are firms which are paying no dividend, but such firms are a small minority. Most concerns are paying substantial dividends; many from 10 to 20%.

Everyone interested in the trade is gravely concerned about the effect of the new Military Service Act, which conscribes married men. Since trade revived early in 1915 the effect of heavy enlistments has been increasingly felt. The conscribing of single men made matters worse and now, on top of that, we have the conscription of married men. Employers who are busy, or, indeed, only moderately busy, are at their wits' end as to how to keep their mills going, so great is the shortage of labor. Hundreds of mules are idle simply for lack of workers. All married spinners and piecers and single spinners and piecers above the age of 26 are now in "reserved occupation," but the mischief had gone far before that step was taken. Moreover, the shortage of labor extends to all departments. Even the fact of being in a reserved occupation does not guarantee immunity from military service.

It is always open for the service tribunal to take the view that in all the circumstances of a particular case, a man would be better employed in the army than in the mill. Overlookers, for example, are reserved, but many have been refused exemption from military service. Only recently, Sir Henry Hibbert drew the attention of Parliament to the present situation and pointed out that the war had to be paid for and that to do that, continued production was necessary. He urged that if much more labor were taken from the cotton industry it would be absolutely impossible to carry it on. But the military are in the saddle and seem to see the war only from their own particular point of view. Indispensable men are daily leaving the trade.

Proposals to lower the school age, with a view to alleviating the labor shortage by obtaining more children, have so far been unfruitful. They have always aroused a great deal of opposition among educationalists and social reformers and, as a matter of fact, a good case has never been made out on their behalf. Obviously, when the shortage is due to the enlistment of the strong, adult men in the army, an increase in the number of child workers is, at best, but a poor makeshift. The latest proposal is to get more work out of the children already employed and to this end the Master Cotton Spinners' Federation has approached the Home Office with a view to the relaxing of the Factory Act so that the children may clean machinery whilst it is in motion. A case in Bolton, in which a firm was summoned for having allowed a child to clean running machinery, has been adjourned pending the decision of the Home Office on the Master Spinners' proposition.

For the year 1915-16 the Fine Cotton Spinners and Doublers' Association will pay a dividend of 8 per cent. This is the eighth successive year for which such a dividend has been paid. The gross profit for the past year, after allowing the usual £140,000 for depreciation, is £675,850 as compared with £531,057 in 1914-15 and £753,415 in 1913-14. The reserve now stands at £1,175,459 and no addition will be made to it this year; but £60,000 will be allowed for investment depreciation, the balance forward will be increased by £28,222 and £10,000 is to be placed to the insurance fund, three sums which together equal 4 per cent on the ordinary shares. In 1912-13 the association paid a bonus of 20 per cent in the form of 5 per cent preferred ordinary shares, to pay for which £450,000 was taken from the reserve. But for the war, another bonus would soon have been due.

The publication for 1916 of Worrall's "Cotton Spinners' and Manufacturers' Directory" makes available some interesting statistics. During the year ended December 21st last, there was for the first time since 1897 a decrease in the total number of spindles. The decrease is not a serious one, amounting as it does to only 93,651 spindles, and is partly due to one or two disastrous fires. The number of spindles in Lancashire at the present time is 59,811,222, against 59,904,873 a year ago and 48,322,684 ten years ago. During last year the number of looms slightly increased. The total is now 808,796, against 808,145 at the end of 1914. Ten years ago the total was 684,811! At the present time little or nothing is being done in the way of mill extension. The war has seen a considerable rise in the price of building material and, further, the course of trade in the future is uncertain.

A Host of Satisfied Customers.

An interesting circular recently sent out by the Economy Fuse & Mfg. Co., Kinzie & Orleans St., Chicago, Ill., shows on both sides of a large 18 x 24 inch sheet, reduced facsimiles of a multitude of repeat orders. Re-orders measure the soundness of a business and the merits of the product. It is evident from the multitude of well known letter-heads and order forms illustrated on these sheets, that the particular buyers of Economy Fuses have found them dependable, safe and economical and have come back for more. These repeat orders express the satisfying results of long continued use. A copy of this folder will doubtless be mailed upon request.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, June 17th, 1916.

The advancing tendency of the market, in evidence one month ago, was checked by the breaking of the recent drouth in the south atlantic states where beneficial general, heavy rains occurred at the close of May and in early part of June, thereby improving the crop outlook in that important section of the belt. With the breaking of the long dry spell in the southeast the market declined about $3 per bale, but part of the break was recovered owing to the continuance of wet weather, resulting in complaints of too much moisture, low temperatures and lack of sufficient sunshine to permit the crop to make satisfactory progress. At the moment dry, warm weather is much desired in all sections of the cotton region in order to permit cultivation and force the growth and fruitage of the plant. The continuance of unsettled, showery weather would cause fields to become grassy, perhaps foul, and probably an increase of weevil complaints.

The weevils are reported numerous in the southern half of Alabama, as far east as Madison county, Florida, in sections of Mississippi, and private advices tell of their appearance in several southwestern counties of Georgia and in central Texas counties. The pest has made its appearance at a comparatively early date this year, and there is much uneasiness lest the weevils do considerable damage this year, as was the case last year.

There will probably be the need of a moderately large crop next season, perhaps 14,500,000 bales even if the European war lasts another year, while such a yield would likely be much too small in event of early peace ahead. Last year's crop was only 12,000,000 bales, due to the small acreage, unfavorable weather and weevil damage. While it is true that there is an increase in acreage of about 10 per cent this year, unfavorable climatic conditions and weevil damage, coupled with the small use of inferior fertilizers, could easily keep the yield per acre down to what it was last year, in which case the indicated yield would be only about 13,200,000 bales, a quantity insufficient by about 1,000,000 bales. On the other hand if favorable crop weather is experienced this year, the production could be of moderate proportions, but hardly any larger than the world will need, even if the war continues for another year.

The United States is developing new markets for cotton goods at the expense of Europe, as is indicated by the increased consumption of American mills, 648,000 bales during May vs 540,000 for corresponding month last year, total for first ten months of season 6,115,000 against 4,681,000 for corresponding time last season. Indications are that American mills will consume a total of about 7,300,000 bales of all kinds this season vs 6,008,000 last season, of which about 7,000,000 will be American cotton against 5,787,000 last season. If the European war continues another year, chances are that the mills of the United States will consume about 7,500,000 bales of American next season vs. about 7,000,000 this season and 5,787,000 last season.

American spinners' stocks on May 31st this year were 1,973,000 bales, last year 1,799,000, and stocks in private and public warehouses, etc., were 2,150,000 vs 2,440,000 one year ago, or a total of 4,123,000 compared with 4,239,000 in 1915.

Thus far this season the South has marketed 11,937,000 bales, whereas spinners' takings of American total 12,491,000, and as the commercial crop points to about 12,400,000, and spinners' taking for the season about 13,900,000, indications are that the world's visible supply of American at the close of this season will be about 1,782,000 bales vs 3,282,000 at close of last season and 1,671,000 at end of season before last. In other words the world's visible supply of American cotton promises to be reduced to normal proportions by the end of July, or to about what it was before the outbreak of the European war. Therefore, the trade will have to depend almost entirely on the new crop for next season's requirements.

It is for this reason that the market is so sensitive to unfavorable weather developments, as it is realized, owing to the moderate increase in acreage, the decrease and inferior quality of fertilizers and the presence of the weevils, not to mention the possibility of an early frost, that almost perfect weather will be necessary during the growing and maturing periods to make a moderately large crop this year. While it is to be hoped that nothing happens to the growing crop, if such a thing should occur, much excitement may be witnessed in the market later on.

The Yarn Market.

The cotton yarn market has been somewhat quieter during the past month, largely owing to a feeling of conservatism on the part of buyers who are somewhat slow to place contracts of any size at the prevailing prices. There is considerable quiet buying, but it is largely for immediate requirement or for use in the near future. Few long time contracts are being placed under present conditions.

At the opening of the month all kinds of prices were being quoted on mercerized yarns, one quotation on 60's 2-ply combed peeler on cones being at $1.05. A sale of 80's mercerized on small cones was reported made at $1.40. There was also a demand for single combed yarns in numbers running from 18's to 30's for quick delivery during this period, although the quantities called for were comparatively small. Carded yarns on cones were quoted on the basis of 23 and 23½ cents for 10's. Weaving yarns remained rather quiet, with prices firm and a strong upward tendency.

Owing to the high prices on ply yarn, a number of spinners of single yarn were said to be installing twisters.

The middle of the month found combed yarns in fine numbers growing scarce and also listed some good buying on carded yarns on cones for future delivery. Some of these sales run from 50,000 to 150,000 pounds and were principally to underwear manufacturers.

As the month closes spinners are reported to be comfortably sold ahead and therefore more or less difficult to deal with in the matter of pricing new business. Weavers seem willing to pay the high prices provided they can obtain satisfactory deliveries. Many of the knitters do not seem to have as yet covered their forward needs except in a rather limited way, and it is common comment among conservative yarn commission houses that a good many of the knitting mills have "overstayed" their market, and will

doubtless have trouble in getting the deliveries they want when they do decide to place their orders. It was reported on the New York market that some spinners have been refusing business for September delivery on the basis of 23 cents for 10's for carded yarns on cones in spite of the fact that they have mostly short term contracts on their books.

Following are middle of the month quotations on the Philadelphia market:

Southern Single Skeins.

6s to 8s	21½ @22	10s	22 @22½
14s	23 @23½	16s	23½
20s	24½ @25	24s	25
26s	25½	30s	31 @31½

Southern Single Warps.

8s	21½ @22	10s	22 @22½
12s	22½ @23	14s	23 @23½
16s	23½	20s	24½
26s	26 @26½	30s	32
40s	40 @41		

Carpet and Upholstery Yarns in Skeins.

8-4 slack	21½ @22	9-4 slack	21½ @22
8-3-4 hard twist	21½		

Southern Two-Ply Skeins.

8s	21½ @22	10s	22½ @23
12s	23 @23½	14s	24
16s	24½	20s	26½ @27
24s	29½	26s	30 @30½
30s	32 @32½	40s	42½ @43
50s	56 @58		

Southern Two-Ply Warps.

8s	22 @22½	10s	22½ @23
12s	23½	14s	24½
16s	24½ @25	20s	27
24s	29 @29½	26s	29½ @30
30s	32½	40s	42 @43
50s	57 @58		

Northern Two-Ply Carded Peeler Skein.

20s	29 @29½	24s	31½ @32
26s	32½ @33	30s	35 @36
36s	40 @41	40s	50 @51
50s	1 @62	60s	70 @72

Two-Ply Combed Peeler Skeins.

20s	36 @37	24s	38 @39
30s	44 @46	40s	55 @56
50s	68 @70	60s	77 @79
70s	86 @88	80s	98 @1.00

Southern Frame Spun Carn on Cones.

8s	21½ @22	10s	22½ @23
12s	23 @23½	14s	23½ @24
16s	24 @24½	18s	24½ @25
20s	25 @25½	22s	25½ @26
24s	26½ @27	26s	27 @27½
30s	27½ @29		

Northern Mule Spun Carded Yarn on Cones.

10s	24 @24½	12s	24½ @25
14s	25 @25½	16s	25½ @26
18s	26 @26½	20s	26½ @27
24s	28 @28½	26s	28½ @29
30s	31½ @32	40s	42 @43

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	32 @32½	12s	32½ @33
14s	33 @33½	16s	33½ @34
18s	34 @34½	20s	35 @35½
22s	35½ @36	24s	36 @36½
26s	36¼ @37	36s	47 @48
40s	50 @52		

COTTON MANUFACTURING.

Designs for Fancy Cotton Fabrics.

BY T. WOODHOUSE AND J. IRELAND.

PART THIRTY.

Some excellent and very ingenious effects of a key-pattern type are obtained by comparatively short floats of warp, or of filling as the case may be, on a perfectly plain ground. The cloth photographically reproduced in Fig. 134 has been made from a design constructed in this manner. The ornament, considered as a whole, runs diagonally to the left at an angle of 45 degrees. When the ornament is

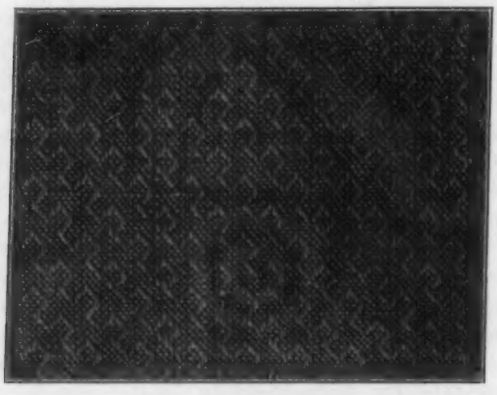


FIG. 134.

reduced to its simplest units, it will be seen that the key pattern is simply a left hand twill and a right hand twill joined together at the proper points to produce the rectangular effect. There are 54 threads per inch of warp, and 52 picks per inch of filling. (In reality, there should be the same number of each.)

One design unit is displayed at X, Fig. 135, in which the key effect is displayed by the solid marks. The draft at Y shows that the pattern can be woven with 14 harnesses, in which case the weaving plan would be that shown at Z. It would probably be simple, however, to make a straight draft on 16 harnesses since this number is little more than that required when the design is reduced to the lowest number of harnesses. The extra two harnesses would make the work simpler for the drawer-in and also for the weaver, and, in addition several other designs, e. g., that in Fig. 133, could be woven without any alteration in drafting.

Perhaps the simplest way to construct this type of

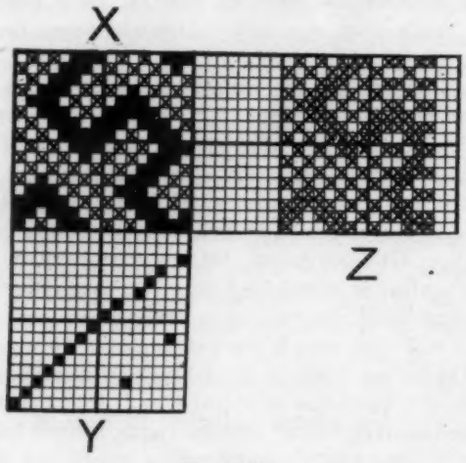


FIG. 135.

design is to introduce the plain weave over all the area set out for the design, and then to add the necessary marks between two adjacent rows, moving to the right or to the left according to the direction required by the ornamental warp effect.

The fabric illustrated in Fig. 136 contains 56 threads per inch of white warp and 53 picks per inch of green filling, and is adorned with a pretty and unique design. The chief feature is the bold herring-bone effect developed by the 10 thread hopsack or basket weave on a broad band of plain cloth. Between each pair of broad bands is a

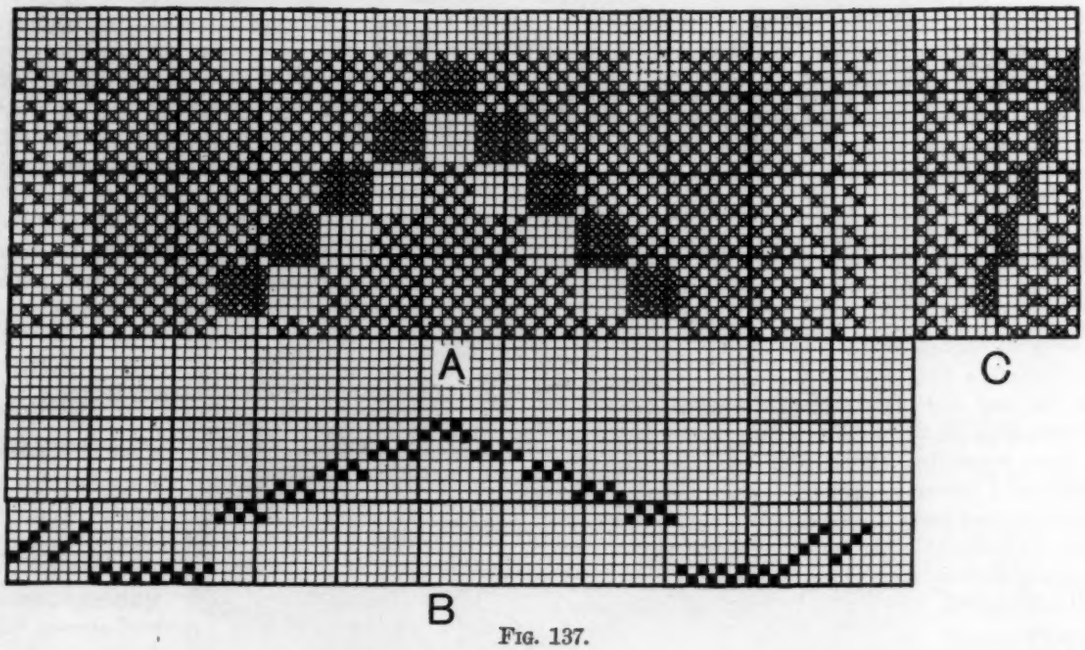


FIG. 137.

narrow band of the 4-thread broken or swansdown weave showing weft on the surface; this is really made from the ⅓ straight twill with the threads arranged in the 1, 3, 2, 4 order. The pattern thus consists of three kinds of stripes, one of which is formed by the herring-bone or inverted V pattern.

One complete unit of the design contains 84 threads and 28 picks, 16 threads of which are employed for the broken twill stripe. The complete design is shown at A, Fig. 137. The above mentioned broken twill occupies the first 8 threads and the last 8 threads. Adjoining the two sides of this broken twill are 12 and 11 threads respectively of

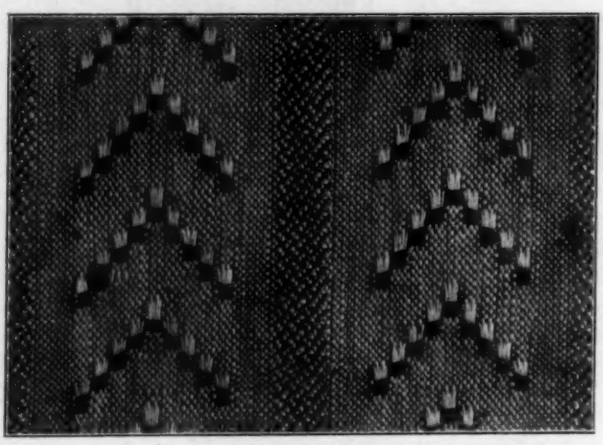


FIG. 136.

plain weave, while the outstanding herring-bone pattern occupies the central 45 threads. The construction will be easily followed, and an examination of the threads reveals the fact that 16 harnesses are required, with the threads arranged in the harnesses as shown at B. The weaving plan on 16 by 28 is shown at C.

There is a slight difference in the interlacing power of the threads in the three sections. It is possible, however, to weave them all from the same beam. The greatest uptake is naturally with the plain threads, and the harnesses through which these plain threads have been drawn are placed in the front nearest the weaver. By adopting this position it follows that these threads, which have to bear a greater stress than the others in weaving, and hence are more liable to break, will have to travel the minimum height and depth to form the necessary size of shed, and, in addition, the broken threads will be more easily taken up by the weaver. It will also be noticed that the two front harnesses carry more threads than any of the others.

(To be continued.)

Mule Spun vs. Frame Spun Yarn.

BY STANLEY H. HART.

In 1915, the total number of cotton spindles in the United States was 33,000,000, 60 per cent of which are located in the Northern States and the remaining 40 per cent in the South. The total number of mule spindles was 5,500,000, which is 20 per cent of the total number of spindles. Only 5 per cent of our mule spindles are located in the South.

The self-acting mule was perfected by Roberts in England in 1825. It was an improvement and combination of the principles employed in Hargreaves' spinning jenny and Arkwright's water wheel, both of which had been in use for about fifty years prior to 1825. The first ring frame was built in 1833 by William Mason, although John Thorpe secured patents covering ring spinning in 1828.

There is no doubt about the necessity for both types of spinning. Each machine has its advantages and disadvantages. The ring spun yarn is harder and stronger than mule spun of the same count, mule spun yarn being known for its softness, fullness and evenness. For these reasons all high-grade knitting yarns are spun on the mule.

The treatment of the yarn in mule spinning can hardly be improved in obtaining fullness, evenness, softness and elasticity in the yarn. The twist is introduced by the yarn

A paper presented at the Fifteenth Annual Meeting of the Alumni Association of the Philadelphia Textile School. All rights reserved.

slipping off the end of the spindle, and, as it does not have to pass under a traveller, the strain on the yarn is much less in winding and twisting than on the ring. Therefore, it is unnecessary to put as much twist in mule spun yarn as in similar yarn spun on the ring frame. Evenness is obtained by the carriage gain giving a slight draft to the yarn while it is being twisted. The twist naturally runs to the light places, therefore the heavy places will be drawn by the carriage and the twist will then distribute itself more evenly, helping to even the yarn. After the twisting is completed, backing-off and winding are accomplished. There is no great tension on the yarn during any of the operations, therefore the natural length of the yarn is wound on the cop and the yarn has retained its full elasticity. On the ring the winding is continually holding the yarn under strong tension as the twist is introduced, and it never has a chance to take its natural position and length, therefore, to a certain extent, it is strained and less elastic than it should be. The drawback to the system of winding on the mule is that about one-third of the time the machine must stop producing to wind up what has been delivered.

The adverse difficulties imposed by the principles of ring spinning, namely the ring, traveller and continuous winding, will never permit ring yarn to be spun equal to that on the mule for softness, evenness, elasticity and regularity of twist. Few mills are able to spin acceptable even yarn on the ring frame above 100's, and up to date this seems to be about the limit for good work on that system. In a few exceptional cases yarn as fine as 140's has been successfully spun on the ring frame. It is very probable that the next twenty-five years will bring forth improvements to the spindle, spindle drive and ring, which will greatly overcome the present differences between mule and ring spun yarns. The tape drive has proven superior to the band, and it seems probable that a more satisfactory drive than this will be invented in the near future. Experiments have been made with a perforated steel band running around the frame to drive each spindle. If the details can be worked out successfully this should make a positive drive so that every spindle would put the same amount of twist in the yarn. Other experiments are to do away with the ring, and get back to the cop spinning similar to the Bradford system of worsted spinning.

The mule is capable of spinning any number up to 400's, and will spin a far shorter fibre than the ring. On numbers from 8's to 80's, inclusive, the ring will produce more yarn per spindle for the same count than the mule. It requires about 30 per cent less power than the ring frame for the same number of spindles, but the cost of lubrication, which is a small item, is about the same for both. The amount of floor space is an important factor, and in this particular the ring frame has a very decided advantage, as it only takes about one-half of the floor space required by the mule, but the depreciation is about the same for both. Probably the greatest factor in the preferment of the ring frame over the mule is the low operating cost on the former. Male spinners are required on the mule and receive about twice the wages paid to girls tending ring frames. One spinner will take care of about the same number of spindles on both machines.

To summarize, the mule is a necessity for fine counts over 100's, and will spin yarn of superior quality to that made by the ring. The ring frame has the advantage in production under 80's, low labor cost and less general expense. The average count spun in the United States is 22's, the great bulk of our yarns being spun between 10's and 40's. Especially in this country, manufacturers are anxious for high production and low cost. Quality is an after consideration so long as the product is salable? The quality required is the main factor in choosing between the ring and mule. If quality is not sacrificed too much by using the ringspun yarn, it will always have the preference, as low cost and high production will turn the scales in its favor.

Making Sample or Pattern Cards.

All finishing plants and every cotton mill where the product is finished at the mill for the market, has before it the problem of preparing annually, or oftener, a series of sample or pattern books for the use of the selling service of the company. The preparation of such samples so they will show up the goods nicely, present a neat appearance and at the same time cost only a nominal amount has long been a subject of more than passing interest to the plants in question.

The managers of these plants will be interested in learning of the new style of pinking machine which has just been

placed on the market by the Smith & Winchester Mfg. Co., of South Windham, Conn. In this machine an advanced type of construction has been maintained, and while of graceful design and nicely finished, it embodies simplicity and great strength, thereby reducing the chances of breakage and the liability of accidents to the operator to the minimum.

This machine, an illustration of which is shown herewith, is simple in its operation and insures accuracy, in that it is connected with a back gauge and controls the movement of this gauge. In using this attachment it is advisable that the goods be placed on the cutting board rather

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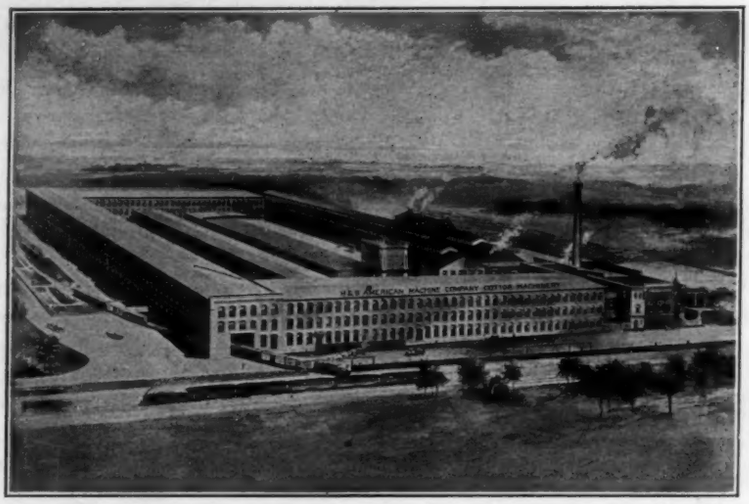
Card Room Machinery



Spinning Room Machinery

Twisters for Wet or Dry Work

With Band or Tape Drive

H. & B. AMERICAN MACHINE COMPANY

PAWTUCKET, R. I.

than on the surface of the table. Before proceeding with the cutting the desired width is first set by bringing the stops to position in the sector which will designate the width as shown by the figures on the index wheel of the machine. By shifting the handle between the interlocking stop, the back gauge is moved forward the proper distance, the cut is made and this process continues until the necessary strips are laid out. This being done, the back gauge is returned to its location on the table, the board being square is again placed against the back gauge and the same operation is repeated. It will be seen from this description that the operator is not compelled to handle the goods after the original cutting, that the material will be cut exactly at right angles and in perfect samples of any desired size.

This company also manufactures a much smaller and lighter machine for small light work which necessarily sells for a much lower price than the machine illustrated.

A new microscope catalog containing 130 pages of illustrated discriptive matter concerning microscopes and accessories for practically all kinds of analytical work has just been issued by the Bausch and Lomb Optical Co., Rochester, N. Y. This company began making microscopes in 1874, aiming then, as today, to produce the highest grade instruments at a moderate cost. This catalog is the 24th edition and presents the most complete line ever yet offered. Of particular interest to the readers of COTTON, is the chemical microscope described on page 81 of this catalog. This is after the design of Dr. E. M. Chamot of Cornell University and is very complete in its equipment. A copy of this catalog may be secured without charge.

A Free Book on Weaving.

The Shambow Shuttle Co., Woonsocket, R. I., announce that they have a limited number of copies of the well known illustrated work on "How to Figure Out and Arrange Pattern Work for Weaving Colored Fabrics," by Superintendent J. G. King of the Elmira Cotton Mills Co., at Burlington, N. C. This book, which contains fourteen chapters on this interesting subject, is illuminated with illustrations in color and all calculations are reduced to simple arithmetic and made as plain as possible. While this work ordinarily sells at $1.00 per copy, the Shambow Shuttle Company state that the copies in their possession will be distributed free to superintendents, agents and overseers of weaving who write in promptly expressing an interest in this book and giving the position occupied.

Changes Name But Not Product.

Effective June 1st, the company formerly known as the Graphite Lubricating Company and located at Bound Brook, N. J., will conduct its business under the title of the Bound Brook Oil-Less Bearing Company.

This change was considered necessary, due to the many misinterpretations throughout the trade as to the exact nature of their product, because of the misleading nature of the former name. Many who were unfamiliar with their bearings being under the impression that they were manufacturers of various graphite greases, lubricants, etc., and being unaware of the fact that they manufacture Bound Brook graphite and bronze oil-less bearings and Nigrum treated wood oil-less bearings exclusively.

Dyeing, Bleaching and Finishing.

The Electrolytic Process of Bleaching.

BY WILLIAM B. NANSON.

It is not my purpose, in the present paper, to enter into or describe the general process of bleaching cotton in all its manifold details, but rather to discuss briefly a single process, with the necessary apparatus for manufacturing chlorine in the bleaching plant by the bleacher himself.

"Electrolytic bleaching" implies bleaching with a substitute for chloride of lime, prepared by an electrical process, but used in the same way as the ordinary preparation of bleaching powder. The result is the production of an electrolytic bleaching lye analogous in composition to bleaching powder, except that completely soluble sodium compounds are present instead of the insoluble lime compounds which leave a harsh and generally undersirable residue upon the bleached fabrics.

When the passage of an electric current through a substance is accompanied by definite changes which are independent of the heating effects of the current, the process is known as electrolyses and the substance is called an electrolyte. Electrolyses, in general, occurs when an electric current is passed through a liquid substance or conductor. Water, when pure, does not conduct electricity, but when metallic salts are dissolved in it, it will do so, at the same time being itself decomposed. Salts, acids, and bases, when dissolved in water are believed to be in a continual state of dissociation and recombination into their constituent portions or ions? Thus sodium chloride, in solution, splits up into sodium and chlorine ions, which are ever combining and separating from one another.

If we use a solution of common salt (sodium chloride) as the electrolyte and pass a current of electricity through it, the sodium which is primarily liberated at the cathode or negative electrode or pole of the electrolyser, decomposes the water and evolves hydrogen, while the chlorine may be evolved as such and may dissolve the anode or positive electrode, or may liberate oxygen from the water, according to the nature of the plate and the concentration of the solution. In the case of a bleachery making its own chlorine by electrolysis, carbon or graphite electrodes are used, which will not dissolve at the anode, and therefore when a solution of common salt is electrolysed by means of carbon electrodes the negative pole or cathode gives off sodium and hydrogen whilst the positive pole or anode evolves chlorine and hydroxyl.

In the type of electrolysers generally employed in a bleach-works the products of the electrolytic decomposition are allowed to combine in the electrolyser; thus the chlorine, as hypochlorous acid, combines with the sodium hydrate to form sodium hypochlorite. The hydrogen, before it escapes, is liable to reduce some of the hypochlorite produced to a chloride, thus causing, sometimes, a considerable loss.

If no porous division be used and the chlorine evolved at the anode be allowed to diffuse itself and freely intermingle with the cathode solution in the electrolyser, the chlorine reacts with the soda, forming sodium hypochlorite, but this is not all,—a little carelessness may cause a complicated set of subsidiary reactions to take place, with an excess of chlorine and at higher temperatures, the hypochlorate may become, for the most part, converted into chlorate, which possesses no bleaching power, whilst any simultaneous electrolysis of a hydroxide, or, water and a chloride (so that hydroxyl and chlorine are simultaneously liberated at the anode) also produces oxygen chlorine compounds direct. At the same time, the diffusion of these compounds into contact with the cathode leads to a partial reduction to chloride, by the removal of the combined oxygen by the instrumentality of the hydrogen there evolved. In proportion as the original chloride is thus reproduced, the efficiency of the process is of course diminished. It is obvious, therefore, that with suitable methods and apparatus, the electrolysis of sodium chloride may be made to yield chlorine, hydrochlorites, (bleaching liquors), chlorates or caustic soda, and it is also obvious that great care must be exercised if any of these products are to be obtained pure or with economy.

The electrolysis of chemical compounds is not generally a simple decomposition into two elements. When copper sulphate is decomposed, the copper is deposited at the negative pole; but no such compound as SO_4 appears at the positive pole. This, if formed, forms sulphuric acid and gives off oxygen. Also, with sodium chloride (common salt), it is separated in aqueous solution into ions Na and Cl, and when the current passes through it, the chlorine is liberated at the positive pole. But it is impossible for sodium to be liberated at the other pole on account of the presence of the water. Hence at the negative pole, hydrogen from the water escapes instead. In the production of electric chlorine the main items of expense are the price of salt and the cost of the electrical current, the other items, namely, labor and maintenance are small.

The apparatus which is the subject in particular of this paper was designed some years ago in Germany by Dr. Oettell, assisted by Messrs. Haas and Stahl, electrical experts. This gives promise of fulfilling our desires for an efficient and economical producer of hydrochlorite of sodium, and one which will compete in its efficiency and economy with the usual bleaching powder solution.

This apparatus consists of an electric cell or electrolyzer formed in an odd shape from a secret composition and placed within a water-tight tank, which tank is carefully insulated to prevent loss of electric current. The electrodes are molded from a composition of carbon and are on the so-caller double-pole system, that is, with one pole at each end of the apparatus and a number of intermediate electrodes that have no contact with each other or with the current except through the solution. The electrolyzer is provided with a negative electrode at one end and a positive electrode at the other. These consist of thick carbon plates standing vertically, extending completely to the bottom of the electrolyzer. All the rest of the electrodes are made up of carbon plates about three-eights of an inch in thick-

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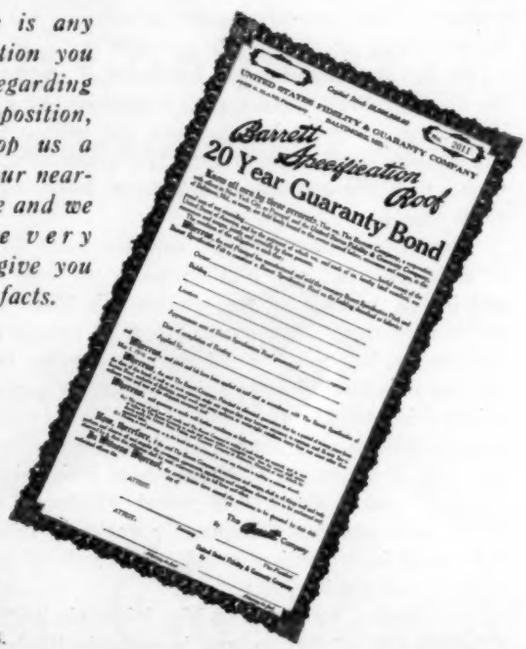
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ness fitting tightly across the apparatus in slides, thus subdividing it into numerous cells. These intermediate electrodes do not fill the entire space from top to bottom; they rest upon a non-conducting plate that projects above the surface of the liquid. The latter arrangement is adopted for two reasons:

First. Each cell thus constituted forms a dead or non-conducting space into which dirt and impurities, carried by the liquor, are deposited without causing short circuiting.

Second. The electrodes are covered with a head of liquor and the bubbles of chlorine gas given off at the electrodes pass through this head of liquor and are absorbed by it, with the result that there is not the slightest odor of chlorine in the room where the apparatus works. These separate cells have no communication with each other, but each cell has a small external opening at the bottom communicating with the brine or solution in the tank, and one at the top, also communicating with the brine in the tank. The tank itself is filled with brine until the brine is on a level with the opening at the top of each cell. The brine flowing through the openings fills each cell to the same level. When the current is turned on a vigorous evolution of hydrogen gas ensues, which causes the liquor in each cell to be carried upward with the escaping gas, thus giving it a head of one-half to one inch over the brine in tank outside the electrolyzer. The brine, of course, flows out from the cell through the opening into the tank and a corresponding amount is drawn in at the bottom of the cell to take its place. Thus there is a constant circulation caused by this evolution of gas. Some heat is evolved in the process, but this is controlled by coils of cold water.

The cells alternate, taking in the liquor from one side at the bottom and forcing it out on the opposite side at the top. No other means are required to give the brine all the circulation through the electrolyzer that is necessary.

The current used is a continuous current of 110 volts, which may be taken from the ordinary lighting circuit. No particular electrical apparatus is necessary, although it is desirable to have the ordinary volt meter and ammeter located at some convenient point in order to know exactly the conditions of the electric current.

So far as relative cost is concerned, I am told that at the Cocheco Print Works with a machine 45 x 30 x 35 inches, was produced in 5½ hours, 126 gallons of sodium hypochlorite solution containing 14.4 grammes of chlorine to the litre, representing 6.86 kilos of active chlorine, or 15.20 pounds.

Bleaching powder, if good, contains about 35 per cent of active chlorine, and if we allow 8 per cent for waste and loss in making up the solution this 15.20 pounds of active chlorine would correspond to 45.36 pounds of bleaching powder, but here I would call to mind that the electric chlorine is more efficient as a bleaching agent than the active chlorine in chloride of lime in the ratio of 3 pounds of electric chlorine to 4 pounds of bleaching powder chlorine and that, therefore the 15.20 pounds of active electric chlorine are equal to about 60.48 pounds of bleaching powder. As we have seen that this quantity was made in 5½ hours, this would be an equivalent of 120 pounds of chloride of lime in each working day.

The electrolyzer shown in Fig. 1 is made by the Electro Chemical Co., of Dayton, and is probably the largest type of electrolyzer made today. This machine will make the equivalent of 200 pounds of chloride of lime daily. Its action is an intermittent one. It has a capacity of 200 gallons for each lot, requiring 90 to 100 amperes for about 3½ hours. It operates under 110 volts, but by wiring two cells in series 220 volts may be employed. It requires a floor space three by five feet in approximate dimensions.

The type made by the same concern, shown in Fig. 2, is a continuous or passage type of machine. This type of cell operates most efficiently as to cost at a concentration of 50 pounds of salt per gallon of water. To make the equiva-

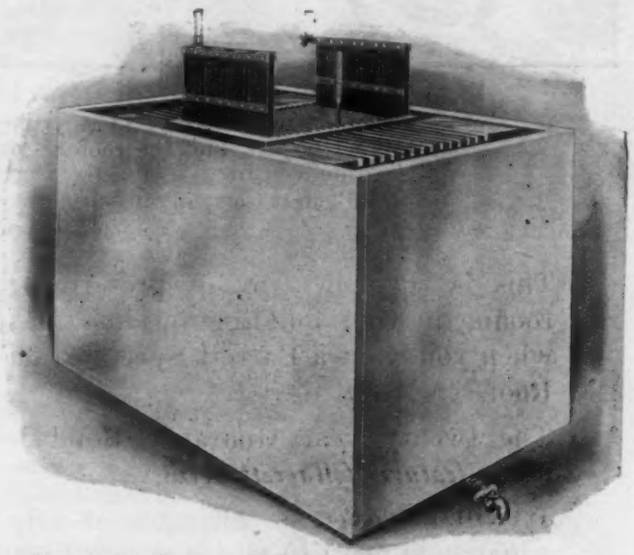

FIG. 1. A TYPE OF INTERMITTENT ELECTROLYZER.

lent of 100 pounds of chloride of lime at this concentration, it requires approximately 150 pounds of salt and 45 kilowatt hours of electricity, though it has been the experience of the writer that it safer to count on 8 to 9 pounds of salt to make one pound of active chlorine, in which case it would take 240 to 270 pounds of salt per 100 pounds.

I might add that this consumption of power, as expressed in kilowatt hours, is the product of the amperage of the current, the voltage (measured at the apparatus) and the number of hours occupied in the making. The weight of chlorine produced is ascertained from the volume of the bleaching liquor made and the number of grains of active chlorine contained in each gallon. This latter can be found in the usual manner by chlorimetry.

For example—a machine working with 70 amperes at 110 volts produces in ten hours 121 gallons of liquor containing 1400 grains of active chlorine per gallon. The consumption of power is therefore $70 \times 110 \times 10 \div 1000 = 77$ kilowatt hours, or 7.7 kilowatts per hour, that is to say about 12 mechanical horsepower during ten hours; and the weight of chlorine produced is $121 \times 1400 \div 7000 = 24\frac{1}{2}$ pounds of active chlorine.

The consumption of salt depends upon the concentration of the brine used and the strength of the resultant bleaching liquor. Since the volume of the bleaching liquor produced is identical with that of the orginal brine taken, the amount of salt consumed in producing one gallon of liquor is greater in proportion as the original solution is more concentrated. If a salt solution be employed containing one pound of salt per gallon, this weight of salt is consumed for every gallon of liquor produced, and according to the strength of the liquor in active chlorine, so will the yield from that weight

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Recommended for all main and countershaft drives, openers, breakers, cards, spoolers, warpers, slashers, and heavy looms where friction drives are used.

We are just as strongly against the use of Pinnacle on spinning and roving frames and looms with automatic shifters, etc., as we are for its universal use on drives such as those mentioned above.

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1—**Pinnacle,** the belt that's two-thirds cotton, used by cotton mills everywhere would increase the production of cotton fabric approximately one million dollars per year.

2—**Pinnacle,** stretched and saturated with the highest quality of rubber friction, loses all characteristics of fabric or duck and at the same time has a pliability not found in leather.

3—**Pinnacle,** used on 80% of all cotton mill drives at a first cost of less than 40% of the cost of leather fully equals leather in service.

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of salt vary, the higher the concentration of the liquor the lower the consumption of salt per unit of chlorine. For example: if the bleaching liquor contain 1400 grains of chlorine per gallon, 5 pounds of salt have been consumed in producing one pound of active chlorine; but if the liquor contain only 840 grains of chlorine per gallon, the consumption of salt per pound of chlorine has been 8.3 pounds. Again, if a 15 per cent solution of salt has been used—containing 1½ pounds of salt per gallon,—and the resulting liquor contain only 840 grains of chlorine per gallon, then 12½ pounds of salt have been consumed in the production of one pound of chlorine.

I know of one concern who has bleached 1000 pounds of knit goods with electric bleach made from 40 pounds of salt and 10½ kilowatt hours of electricity. Salt cost them $3 per ton at the mill. Power cost them about three-quarters of a cent per kilowatt hour, making a total of 14 cents for bleaching 1000 pounds of goods. Another used 50 pounds of salt and 13.02 kilowatt hours. Salt cost them $3 per ton and power was furnished by a local power company at 1⅛ cents for 1000 pounds. Another mill using jiggers for bleaching and throwing away the bleach after each lot used 125 pounds of salt per 1000 pounds of goods and 32½ kilowatt hours. Salt cost this mill $4 per ton and total power 24 cents, making a total of 49 cents per 1000 pounds.

All of these examples were published on page 35 of the November, 1911, number of COTTON. It must be remembered, however, that these prices were existant before the war and may not now be available—for instance Ohio River salt is now quoted at $10 per ton although there may be coarser and rougher qualities to be had in the market at a much lower figure. It has been the experience of the writer that it requires about 7 tons of salt at say $10 per ton, or $70 to make one ton of active chlorine, which is the equivalent of 3 tons of chloride of lime. It also requires about 6160 kilowatt hours at a cost of 1 cent (approximately) or $61.60, or a total for salt and power of $131.60 for the equivalent of 3 tons of chloride of lime. Chloride of lime is selling at this writing for about 11 cents per pound or $220 per ton and three tons would cost $660 as against $131.60 for its equivalent in electric chlorine. In other words while chloride of lime is selling for 11 cents per pound its equivalent can be made in one's own bleachhouse by electrolysis for 2.19 cents per pound under the conditions outlined.

Where water power is easily available there is no doubt that the chlorine can be made even cheaper than chloride of lime at its normal prices, for the above figures are based upon power furnished by a steam plant. However, purchased power prices will vary in different sections.

The electrolytic bleach possesses advantages of such a character that its adoption is a movement in the line of efficiency. Where the electric light is installed in a plant and its wires available to give the necessary current, the low initial cost of installation must be considered as greatly in its favor. If a bleachery is fitted with a thoroughly up-to-date equipment for using chloride of lime, it will cost more to install the usual mixing tanks, with agitators and other accessories, than it will cost to install an electrolyzer.

The stock bleached with electrolytic chlorine is softer than with a chloride of lime bleach, and there are no lime or other insoluble salts to remain in the fibre and therefore, except for gun or absorbent cotton, the white souring operations are unnecessary and the goods may be rinsed from the chlorine and immediately dried up.

The apparatus is simple and easy to use. It operates as follows: The brine tank "A" Figs. 3 and 4, is filled with a quantity of water, say 400 gallons, to which is added common salt in the ratio of about one-half pound to the gallon for a continuous passage type of machine to 1½ pounds to the gallon for the intermittent type of electrolyzer. This salt is quickly dissolved in cold water by means of an agitator. It is then allowed to run through the electrolyzer "B", at the same time the current is turned on

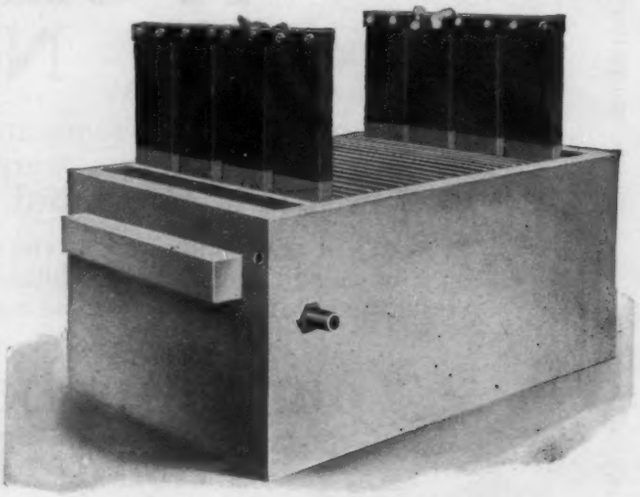
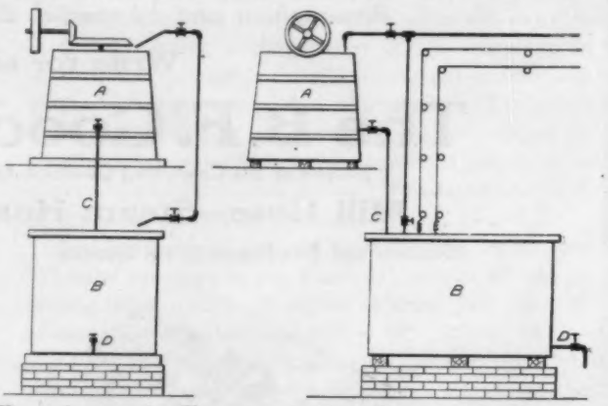


FIG. 2. A CONTINUOUS OR PASSAGE TYPE OF ELECTROLYZER.

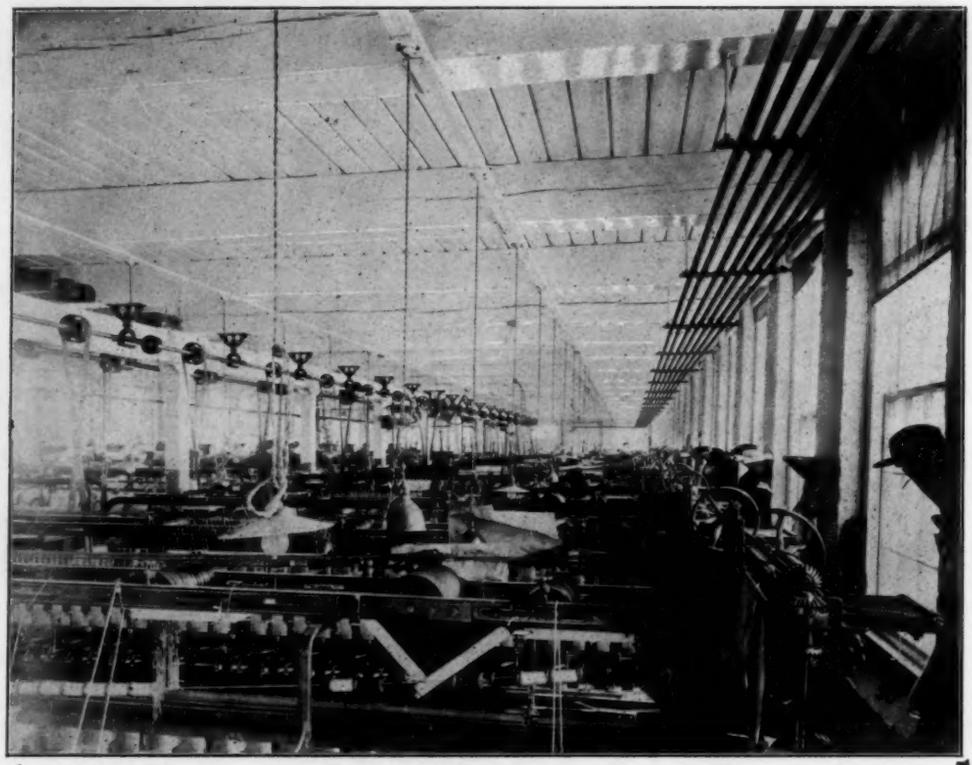
and the action commences at once, the resulting bleach liquor is therefore of constant strength, and if the machine is of the passage type, runs continuously through the electrolyzer. The brine runs in continuously at the point "C" and out as hypochlorite solution at the point "D" where it may be conducted into a storage tank beneath the floor. In the intermittent type the stronger brine is run into the



FIGS. 3 AND 4. FRONT AND SIDE ELEVATIONS SHOWING GENERAL ARRANGEMENT.

electrolyzer until it is full, and the current turned on the electrolyzer for 3 to 5 hours until the brine in the cell is completely electrolysed, when it is run out as before. This latter intermittent type gives a stronger bleaching liquor but requires more care in making. I would add, parenthetically, that the electrolyzer acts only under a direct current; an alternating current cannot be used.

Having run the brine into and started the current in the electrolyzer the chemical action of the electricity first liber-



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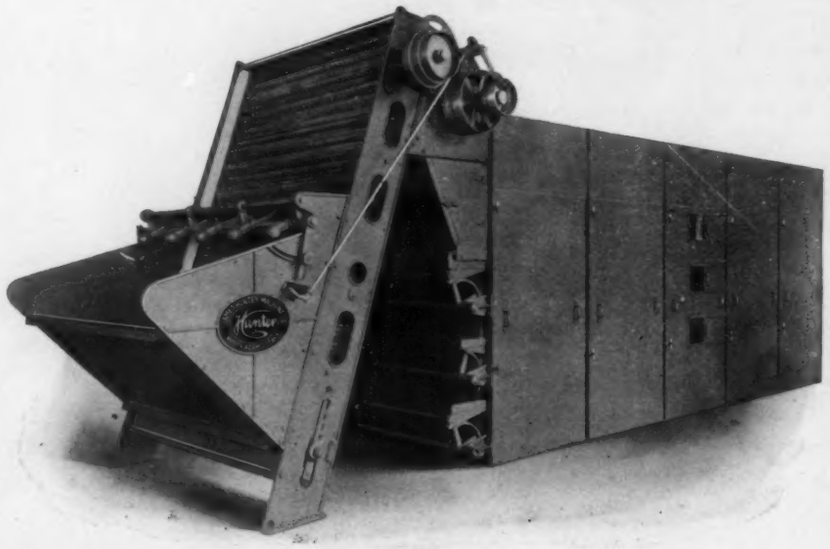

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ates the chlorine, the chlorine being liberated at one of the electrodes and the sodium at the other electrode. The metal thus set free from its combination with chlorine combines with oxygen and part of the hydrogen and so becomes converted into sodium hydrate (caustic soda) the oxygen and hydrogen being obtained from the water of the solution, a portion of which is decomposed, and hydrogen gas is evolved. This gas passes away from the electrolyzer into the air, but could be collected and used as fuel to furnish power to run the machine, though this is, I believe, never done. The liberated chlorine will, when it is set free, combine with a portion of the alkali in solution and a hypochlorite will be formed. The hypochlorite thus formed will, by the continued action of the heat evolved, be resolved partly into a chlorate of soda and partly into a chloride of soda and the chloride will again be reconverted into a hypochlorite as before and so indefinitely so long as the machine is running. These conversions and reconversions which use up and waste the current, point out the importance of keeping the liquor cool, not over 28 degrees Centigrade. Working ten hours a day the electrodes will not need to be replaced for eighteen months. The connecting terminals are of unoxidizable metal, the draw off taps and bottom valves of stoneware; and consequently all parts of the apparatus are protected from the action of chlorine and practically indestructible.

The electro chemical production of chlorine presents some difficulties however, owing to the fact, that if due care is not used, secondary or subsidiary reactions are liable to occur at the electrodes, and also to the fact that the water is decomposed with the consequent liberation of oxygen and hydrogen. First there is the reduction of hypochlorite to chloride by the H ions liberated at the cathode. Then there is the discharge of oxygen at the anode from the O Cl ions present when a certain amount of Na Cl has been generated, as these are readier carriers of current than Cl alone. This action is accompanied by the formation of hypochlorous and chloric acids. Then there is always the possibility of the oxidation of the hypochlorite to chlorate and also its decomposition into Na Cl. Chlorates are not easily formed however as long as the solution is slightly akaline. A certain alkalinity is conducive to stability but at the same time militates against rapid bleaching, this however is not always undesirable as the ultimate results obtained are the same—the bleach from an alkaline solution is just as white as one from a neutral or acid solution, but it takes more time. The formation of chlorates is also induced by a high temperature. The remedy for this is a rapid circulation of the electrolyte in the cells and external cooling of the liquor by means of a cold water coil of piping.

As already shown the temperature that is best suited for electrolysing is from 20 to 28 degrees Centigrade, (68 to 80 F.) with a maximum of 40 degrees Centigrade. A lower temperature than this appreciably increases the resistance to the current and shows poor results, while the loss of hypochlorite becomes very marked at higher temperatures than these, owing to the formation of chlorate, which as already stated possesses no bleaching power.

When oxidation occurs at the anode a corresponding reduction takes place at the cathode resulting again in a reproduction of sodium chloride, and the amount of this reduction increases with the concentration of the hypochlorite until is possible to reach a point where the hypochlorite may be decomposed as fast as it is formed.

Regarding the efficiency of electrolytic chlorine, Dr. Frass concludes, after many and exhaustive experiments, that using equal amounts of chlorine and working under the same conditions, the electrolytic liquor gave better bleaching effects than chloride of lime. That if the bleaching effect be stopped at the same degree of whiteness, the use of electrolytic liquor allows a saving of 5 per cent of chlorine to be made when working with alkaline solutions. That the presence of an excess of bleaching liquor does not alter these comparative results. And that an increase of alkalinity diminishes the rate of bleaching but increases the final effectiveness of the bleach.

As regards the cost of installation, approximately it will cost about $300 to install one cell, which will make the equivalent of about 100 pounds of chloride of lime in ten hours. It will also require the installment of a 10 k. w. generator to run it and the necessary power to run the generator.

In conclusion I might suggest that if common salt, by real or artificial scarcity, should rise in price to impossible figures, there is still left the broad waters of the Atlantic Ocean which if evaporated down to about 6 to 8 degrees Twaddel, which can be readily and easily done, would make an inexhaustible body of electrolyte for producting chlorine. Owing to the magnesium chloride which sea water contains, in solution with the sodium chloride, it would produce a far more active bleaching agent than the hypochlorite made from common salt alone, but the solution would be more unstable and would have to be used as quickly as made, although the temperature and also the alkalinity would influence greatly its stability. I would, therefore, suggest to those bleaching cotton for nitrating purposes, or, in fact, for any purpose, where possible to locate their plants at the seashore, or, where salt water can be readily obtained, this will enable them to make their own chlorine and caustic soda in inexhaustible quantities, as caustic soda, as well as chlorine, can, with the aid of Glauber salts and hydrate of lime, be made out of sea water. It is probable, however, that if some progressive bleacher were to perfect a practical process for doing this, the "Market" would either shove up the price of Glauber salt, which now sells for about ¾ cents per pound, and freeze him out, or file an option on the Atlantic Ocean.

The making of chlorine and caustic soda from sea water by electrolysis is no pipe dream, it can be done, and it has been done, C. Hermite did it over 25 years ago, and the only reason why he failed to make a commercial success of it was, 1st. His apparatus was defective. 2nd. His electrolyte was weak as it did not seem to occur to him to evaporate his sea water down to an efficient strength before electrolysing it. He did not realize that the conductivity of very dilute salt solutions is proportional to their concentration. When the solution is weak, hydrogen and oxygen are evolved; but as the concentration is increased; and the current raised, more and more chlorine is liberated, it will be therefore seen that it is not economical to use very dilute electrolytes such as sea water without first concentrating it by more or less evaporation. The third reason for Hermite's failure was the fact that he had to compete with chloride of lime at 1½ cents a pound—a factor that does not now exist.

Practical Problems Discussed by Cotton's Readers

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so indorsed. This department is open to all. Suitable letters are paid for in cash.

A Winding Room Experience! ! !

EDITOR COTTON:

If you will allow me space in your paper I would like to say a few words in regard to A. M. Oliver's recent article "A Winding Room Experience."

Mr. Oliver says that an efficiency engineer must not only combine the part of the time study man, but must have the ability to take the existing evils in a department in a cotton mill and so change them that a greater production will be gained, that the percentage of waste will be reduced, and both accomplished at a resultant saving in cost per pound of labor involved.

I would like to ask what are the overseers for in those mills?

Mr. Oliver says that the room in question had been previously systematized by time study men and that the method worked well, and the time study man had made a good showing in cost reduction. It seems to the writer that the cost was very high even when Mr. Oliver went to the mill, as he was able to reduce it 10 per cent.

He says further that after investigating the department he found that the percentage of waste was high, due to the yarn slubbing over the ends of the packages in the process of winding or in transit to the creel, or in the creel. Now Mr. Oliver does not mean to say that this was a first class mill, does he; a mill that had a winder man who would allow such work as that to leave his room?

Also Mr. Oliver says that these time study men had experimented and found that the best spindle speed was 1400 r. p. m. Then he tells us that anyone familiar with a Universal winder knows that the spindle speed is constant. Now doesn't Mr. Oliver think that when he made larger wood centers for the winding that he only increased the winding speed of the yarn, when he had just told us that the speed of 1400 r. p. m. with the small tubes was the best? I might add that he can run a spindle speed of even 1600 r. p. m. on Universal winders if his yarn would stand it.

He says that he had the winders set so as to make an open wind and this alone made a reduction in package waste of 65 per cent. May I ask what was the percentage before he made that suggestion?

I cannot agree with Mr. Oliver in regard to the open wind. Anyone who understands a Universal winder knows very well that the closest wind is the best, especially on tubes. The trouble was, as I see it, that he had no one at the mill who understood the winders. The winders surely did not have the right gainer pulleys for the yarn he was trying to run, as if a Universal winder is set right it *will* make good tubes.

No one could wonder that the management felt that this process was more expensive than spooling. Winding on winders is always more expensive than spooling. It seems to the writer's mind that an efficiency engineer should also have seen that fact, and in conclusion I will say that if this was a high class mill at which Mr. Oliver made this record, it would pay the machine buidlers to hire him not to go to any other mills, because if he can do so well the machine men will never get to sell any more machinery.

Honest Bill. (Ky.)

Card Room Management.

EDITOR COTTON:

I am enclosing you a letter on cardroom management and would be glad to hear from other readers on this subject.

The carder's aim should be, first, to produce good work with as large a production as is consistent with the quality of the work required to avoid unnecessary waste, keeping down the expense of wages and power and keeping the machinery in good condition. Second, an overseer must study and make himself thoroughly acquainted with the different tempers and dispositions of the operatives under his charge and adapt his conduct and proceedings accordingly. He must keep cool and good tempered and so conduct himself toward his help as to gain their respect and esteem, and no matter what happens, he must be ready to give instructions to those who are in need of them instead of running with questions to the superintendent, who always has enough troubles of his own.

An overseer should never complain. No matter what happens he should be ever ready to grasp the situation and protect his company's interest and exercise justice toward all concerned and keeping everybody busy instead of trying to do all the work himself.

Managing help in any room of any cotton mill is a very important factor in the successful operation of the room and also the plant. An overseer should be a good judge of human nature so that he can employ people of good morals, who will work and do all in their power for the good of themselves and the room, even if only a picker hand is being employed. The importance of filling the automatic boxes evenly at all times should be explained, the evener motion should also be explained and it should be shown to the new operator that when laps are allowed to run out such a practice is quickly discovered in the cardroom.

If a grinder is being employed question him about his ability as a grinder. Ask him about his methods of setting and what distance he sets the different parts.

The stripper when employed should be questioned about letting laps run out, he should be told that letting a lap run out in this room means immediate discharge, owing to such carelessness doing so much damage to the different parts of the card.

If a person is employed for sliver lap, ribbon lap, comber or drawing frames, the proper method of piecing should be outlined and the person told about the ends put up at

the back just slightly over-lapping the end running out.

If persons are employed for fly frames, they too should be questioned, and not put in charge of a pair of frames just because they say they can run a set. They should be questioned regarding the cleanliness of the work. They should be asked what parts should be kept clean, etc. Of course there are times when a hand could not well explain herself, and still be a good speeder tender. The object in questioning a hand in that respect is to learn from the person whether they understand the importance of keeping the top rolls cleaned, keeping the hollow leg of the flyer clean, the rack, and all gears governing the excess speed. Some carders may think that the method given is a long one in employing help, but let me say that it is often one or two hours after starting before the writer has all hands in place owing to the amount of questions demanded from the employees.

Besides explaining to them the manner in which their duty should be performed, this little trouble at the start has convinced me that people employed under such conditions will stay longer and will not be always changing from one mill to another. Where you find a steady class of help in a mill, which is one of the chief points in the success of the room or plant, you find good production and good quality also.

There is one point in managing help that will cause the loss of influence, and that is in yielding a point to a hand because that hand is of a family of influence or connected with a large family of help. Have the room discipline carried out to the letter in the department of which you have charge, no matter at what cost.

Do not place too much confidence in your second hand until he has proved up, as sometimes good help are forced to quit their jobs for no other reason than the second hand imposing on them, by not keeping their machines in good order.

All good observant overseers of carding will, after placing the help, make their rounds first to the picker room to see if the automatic feeders are being filled evenly, the small lattice apron should also be examined. If the beaters are making too much noise the machines should be stopped and the beater examined, because beaters when dull make a noise caused by the vibration due to the blades of the beater being dull and not chopping off the cotton at each blow as it should. The evener belts should be examined and also the record of laps weights. Weigh a couple of laps yourself, but at different times each day.

A carder should walk up and down each card alley and while passing the back of the cards the flats should be examined to see if the wire on the flats are injured from a high place in the cylinder, caused by the card fillet blistering, etc. When passing each card the web should be examined by taking a portion of the web from the card. and if not satisfactory, the carder should be able to place the blame in the proper place for such conditions.

Sometimes the web on a card is very deceiving, for instance, a comb band breaks and is not detected by any one. The card will fill to such an extent that it will stop owing to the consumption of power required being too great for the driving belt. In the majority of cases of this character a couple of strippers and grinders will put all their power to the driving pulley, and with the aid of the driving belt and the new comb band that operates the comb, the cylinder and doffer is made to revolve and the amount of cotton on the cylinder and doffer partly removed by the doffer comb.

A. B. (N. C.)

Making Three Ply Cloth.

EDITOR COTTON:

Will some of your contributors please describe a design that will weave 3-ply cloth on a cam loom or a chain head loom?

S. E. S. (Md.)

EDITOR COTTON:

Replying to your correspondent in regard to a design showing how to weave 3-ply cloth on a cam or chain head loom, would say that his question is very indefinite. He does not state what weaves have to be used in the 3-ply cloth, so I presume that any weaves selected will be satisfactory to him. Fig. 1 is a design and drawing-in draft for a 3-ply cloth using the plain weave on all the three cloths.

All 3-ply cloths have to be bound together as three separate cloths, one above the other would be made. In this case the middle cloth is bound to the face cloth by raising a middle end over a face pick which binds the two cloths

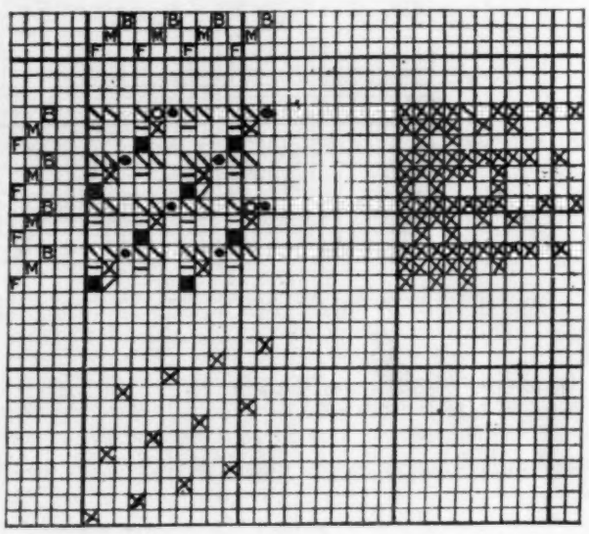

FIG. 1. FIG. 2.

together. This is shown by a diagonal mark on first pick second end, also seventh pick, eighth end. The middle cloth is bound to the back cloth by lowering a middle end under a back pick, which binds these two cloths together. This is done on the sixth pick and eleventh end, also, the twelfth pick and fifth end. The circle indicates the end lowered.

The ends and picks are marked F, M and B which indicates F for face ends and picks, M for middle ends and picks, B for back ends and picks.

The rules for making 3-ply cloths are as follows: 1st, in face ends and picks, put the face pattern; 2nd, in middle ends and picks, put the middle pattern; 3d, in back ends and picks, put the back pattern; 4th, on every middle pick raise every face end; 5th, on every back pick raise every middle and face end; 6th, bind the middle to both face and back cloths to make one solid cloth.

The binding in this case has been done as stated, though in some cases the binding is made by bringing the back end onto the face cloth, but the method given is probably the best. If colored yarns are used, the binding points will

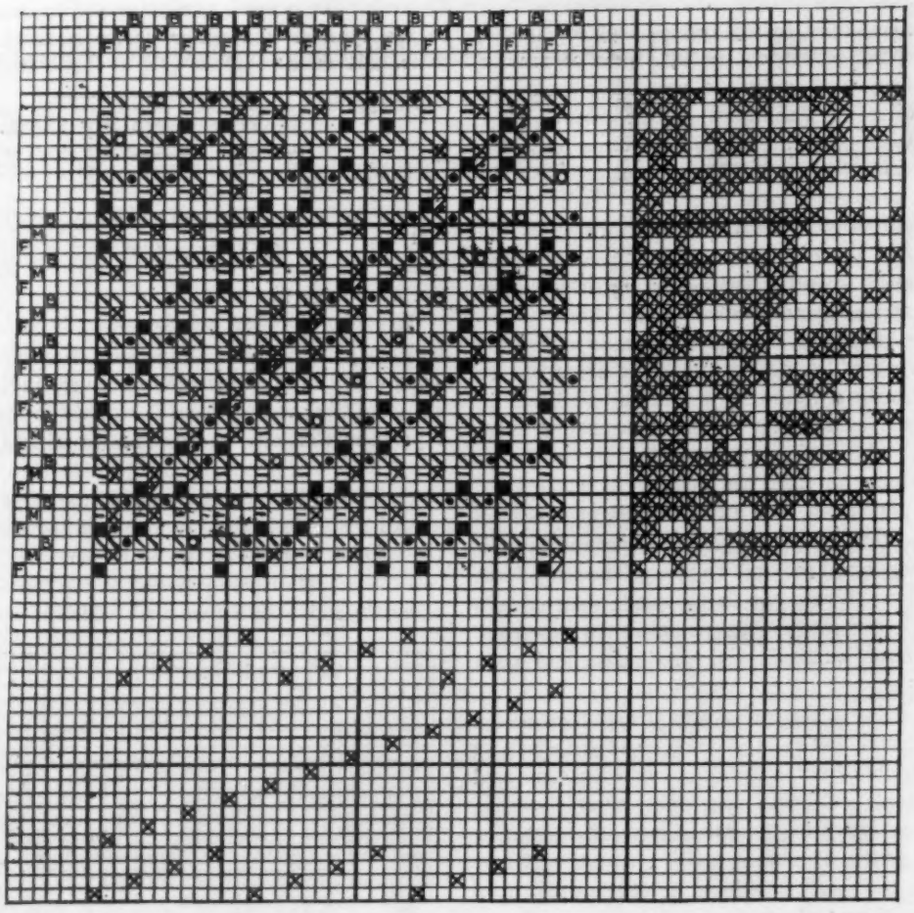

FIG. 3.

FIG. 4.

show in the cloth because they can not be covered as the plain weave is being used. To effectually cover binding points, the ends should float on both sides of the binding end when it is raised, but this cannot be done on the weave used.

Another design, drawing-in draft and chain plan for a 3-ply cloth is given as Figs. 3 and 4. In this design the two up two down twill is used for face and back, and the three up and three down twill used for the middle cloths. The binding of the cloths together is done in the 12 harness order, which necessitates 12 harnesses being used for the middle cloth. The binding points in this design have been selected so that they will not show either on the face or back of the cloth. The middle cloth is first bound to the face cloth on the first pick, 36th end, which shows two face ends raised on both sides. This follows in regular order throughout the design. The middle cloth is first bound to the back cloth on the third pick, 8th end which shows two back ends lowered on both sides. The circle indicates ends lowered,

The key to this design is as follows: Solid squares, face ends and picks; crosses, middle ends and picks; dots, back ends and picks; dashes, face ends raised on middle picks; diagonals to left, face and middle ends raised on back picks; diagonals to right, middle ends raised to bind middle cloth to face cloth; and circles, middle ends lowered to bind middle cloth to face cloth.

T. N. (North Carolina.)

Be Careful.

A new hint heads a list of ten anti-fire rules sent out from the Forestry Bureau at Washington last summer. The rule is simply this: "Break your match in two before you throw it away."

It may sound absurd. But if you've never tried it, suppose you do so. You'll find that you can't break that match in two without burning your finger unless you've first blown it out and held it for a moment for the glowing end to cool.

Thousands of hunters and campers in all the national forests caught up that rule because it struck their fancy and was perfectly simple and easy. Most fires in the woods have probably been caused by lighted matches thrown away by careless smokers. Those broken matches don't start any fires.

However, there are far more people throwing away lighted matches in homes and offices and public places than there are in forests. And most city fires come from that very cause. If the simple forestry rule were applied everywhere, and every man would break his match every time he lighted his cigar or pipe or cigarette, and every woman would break hers every time she lighted the gas, there would be a different tale to tell in the year's fire statistics.

This may not apply inside the mill, but it certainly does apply outside. Train yourself and train your children to be careful. Begin now.

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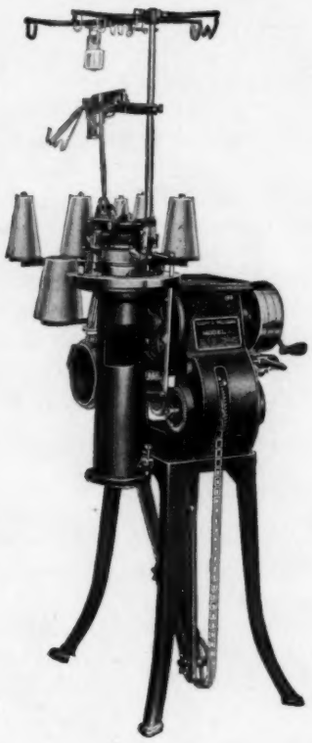

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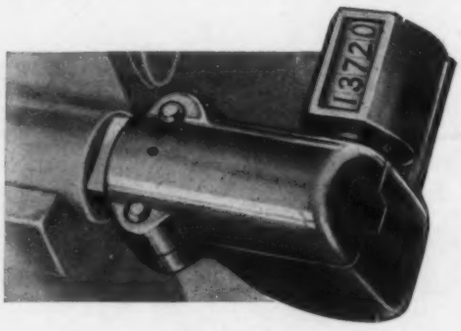

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Calculating Yarn Counts and Weights

BY WILLIAM DAVIS, M. A.

I have dealt hitherto with the structural side of embroidery and knitted fabrics, relating to the designs produced on the fabric and the methods of producing them. In this connection it is of some importance for the knitting mill man to have some understanding of the alteration in weight made when he introduces those yarns over and above the ground fabric. One of the chief reasons for this is to know what increase in weight is made when a stripe of a given size and dimension is added to the cloth; or the problem may be put in the form of a percentage which has to be allowed when taking account of the cost accounting of such goods.

If the articles are intended for the export trade then it becomes of greater importance to know the weight percentage present in the goods, because for countries such as France the duties levied in entering the country are generally made on the percentage of weight of the constituent yarns present in the fabric. In any case it is of the greatest importance that the overseer should thoroughly understand the principles which govern such matters as those indicated. A very well known case is in the example of pure silk which is frequently employed as the material with which such goods have to be ornamented. The material is costly and it is to the interest of the manufacturer to see that the utmost use is made of every particle and the favorite device is to introduce it in the form of embroidered stripes where the bulk of the threads are thrown to the surface of the fabric and a minimum made to appear on the face of the fabric. Now in the case of silk and its application to knitted goods, the average mind fails to grasp its high value when it is a matter of estimating the percentage of weight present. The yarn is very deceptive in regard to its actual counts, the color is usually white or some brilliant tint which fills well the eye and makes it appear as if it were much thicker than the weight would justify. Thus when such estimations are left to be a matter of guesswork the proportion guessed is usually much greater than it actually is in fact and the duties levied are greater in comparison.

One is right in stating that there is no problem so little and so imperfectly understood as that of the proportional weight of different sizes of yarns present in a knitted fabric and it is a problem which comes into prominence at every turn when a diversity of yarns and materials are made use of in the knitting mill. When accounting the cost of the fabric the matter of relative weights of the constituent yarns comes into first place and it is unfortunate that so little clear understanding of the problem has been shown.

To outline the principles on which this is drawn out, it will be advisable to recount the basic principles governing the estimation of the size numbers for the main types of yarns. The two chief systems are, of course, those attributed to the worsted and cotton branches of the trade, the worsted branch being based on the number of 560 yard cuts or hanks which go to weigh 16 ounces, whilst the cotton system is worked out in the same manner except that the basic cut or hank length is 840 yards. The latter length is a most remarkable figure and one which has persisted from the origin of the cotton trade in Great Britain. On many occasions it has been proposed in different countries to introduce some of the so-called more rational methods of nomenclature for cotton counts but they have in almost every case ended in failure. The most noteworthy example is that of the metric system, when it was proposed to give the count as the number of kilometers which went to weigh a kilogramme. The system by itself is simple, but it has not been adopted in any general way nor has it found extensive approval. It seems that the old scheme of 840 yards has come to be encircled with a halo of commercial romance, and all the traditions of the trade seem to be woven round the old number.

It was seriously proposed some years ago to abolish diverse languages by the introduction of the universal Esperanto, but all are aware that the attempt has only met with scant encouragement. Under the same number as cotton may be placed the yarns which are so often used in embroidery, namely, the mercerized threads, these are taken into the same system of 840 yards. Also when yarns are made by mixing cotton and wool in the fibre and often by twisting them together thread with thread, the blend usually goes by the 840 denomination. The method is also applied to a large variety of the spun silk yarns used in the trade, there being a well known exception in the case of the two-fold silk yarn where the number given represents the actual counts whether the yarn appears in the form of a two, three or multi-twist yarn.

As an example let us assume that a fabric has been embroidered with a mercerized yarn equal to 2/40's cotton counts and that the ground yarn consists of 2/30's cotton. Let the embroidery thread be present in the cloth as a solid stripe placed over and above the ground as an extra every fifth needle; to make the calculation one would proceed as follows: 2/30's cotton = 15's single. 2/40's cotton = 20's single. Now as the extra mercerized thread is on the top of the ground stitch at every fifth needle, the relation between the two yarns may be expressed as 5 threads of 15's ground to 1 thread of 20's embroidery. 5 threads of 15's is equivalent to a single thread of 3's for comparison and the weight proportion may then be stated thus: 20 hanks of 20's = 1 lb. 20 hanks of 3's = 6 2/3 lbs. From this relation we see that out of a total weight of 7 2/3 lbs., 1 lb. is the mercerized thread and the percentage of weight is at once obtained $1 \div 7\ 2/3 \times 100 = 13$ per cent approximately, which leaves 87 per cent for the ground yarn.

As a further example let us vary the ground of the fabric to 2/30's worsted count and reduce the embroidery thread to a size 2/40's spun silk count, the embroidery being introduced as before every fifth needle in the width. In this case the two counts given are of a different denomination and no result in percentage of weight will be accurate until both are in the same system. Let the silk counts be transferred to the worsted denomination thus $40 \times 840 \div 560 =$ 60's worsted. The count of 2/30's = 15's single, which occurs for 5 needles and gives an equivalent count of 3's

as before. Now we proceed with the calculation thus: 60 hanks of 60's = 1 lb. 60 hanks of 3's = 20 lbs., a total of 21 lbs. $1 \div 21 \times 100 = 4\ 16/21$ per cent of silk with the remaining weight of 95 5/21 per cent given as the percentage of the worsted ground.

In both of those examples it has been assumed that the length of the silk and mercerized cotton embroidery yarns take up the same space and give the same length of loop as the ground threads. This may be so, or approximately so, in the case of a single straight stripe, but if the stripe is made zig-zag or introduced in some more irregular way then this requires to be carefully taken account of in estimating the weight percentage of the respective colors. If the fancy yarns are made to shog to the right or left, then allowance will require to be made for the yarn taken up in the shogging operation, that is in crossing from the one stripe to another there is a take up of the length of the thread which is by no means negligible. Now the exact allowance to be made must be a matter of difficulty because there is no ground yarn which one can extract for the purpose of measurement and comparison, the base threads intersect themselves crosswise whilst the intersection of the embroidery thread takes place lengthwise. Perhaps the most practical method is to have a sample of a straight embroidered stripe at hand for the fabric with the irregular pattern to be compared with. If a piece of each can be secured for dissection the straight stripe to a given length can be taken unraveled and measured and similarly for the pattern embroidery. The comparative lengths will at once give the relative weights and all the necessary information. As a further illustration let us take the case of a woolen ground on which an embroidery thread of worsted is being worked in a fancy zig-zag pattern. The ground yarn is in the cut woolen system which has as its basis a length of cut 200 yards and the standard weight 16 ozs. The counts of the ground yarn is 28 cut and the worsted fancy yarn is 2/24's. On unraveling a piece of this it is found that the pattern is such as to cause the thread to take-up an extra length of yarn = 50 per cent and the fancy embroidery yarn occurs in the proportion of 1 in every 8 courses. To give a clear start for the calculation it will be necessary for us to bring the two counts into the same denomination and as the worsted number is the better known let the woolen thread be expressed in this system. $28 \times 200 \div 560 =$ 10's worsted counts for the ground. Before we can use the ordinary formula to find the proportional weight, the matter of the take up will require to be allowed for. The fancy yarn is stated to be 2/24's = 12's single, but it is used in increased length so that the weight is augmented by 50 per cent. For purposes of comparison it will be sufficient to obtain a count of yarn which will weigh 50 per cent more than the 12's. Now the weights of yarn are in the inverse ratio of their counts and a simple calculation will show that 8's is the count required. By adding 50 per cent to 8 we obtain the number 12's.

From this statement it is seen that the embroidery yarn occurs once for every 8 courses of the ground so that it will be necessary to divide the counts of the ground yarn by 8 to obtain the correct relation, after which we can use the ordinary formula to obtain the relative percentage. $10\text{'s} \div 8 = 1.25$ single. 8 cuts of 8's = 1 lb. 8 cuts of 1.25 = 6.4 lbs. or a total of 7.4 lbs. $1 \div 7.4 \times 100 =$ 13.5 per cent of the worsted embroidery yarn and 86.5 per cent of the woolen ground.

As another example of the same fabric calculation let is take the case of a ground fabric which has two courses of 2/40's silk and 6 courses of 2/48's worsted. Before we can calculate the relative weights we will require to deal with the problem of having the two yarns used in this manner and the original formula can be used for finding the relative proportion of weights and also the weight percentage of the two yarns. 6 courses of 2/48's = 24's. this divided by 6 gives the number 4's. 40/2 spun silk into worsted counts $= 40 \times 840 \div 560 = 60$'s, which divided by 2 gives 30's. For the relative weight percentages these two numbers 4 and 30 can be taken in the inverse ratio of the count numbers, thus for every 4 lbs. of silk there will be 30 lbs. of ground worsted used, that is the worsted will always be 7½ times the weight of the silk. Expressed as a percentage it becomes $1 \div 8\frac{1}{2} \times 100 = 11\ 13/17$ per cent of silk with the remaining 88 4/17 per cent of ground.

If in addition to a calculation such as this, which would in itself be useful, we require to perform estimates for the addition of embroidery, it is very convenient to obtain in the first place the average counts of the yarn over the whole fabric. This can be done by a simple modification of the formula we have used throughout this article, which is as follows: 6 courses of 24's gives 4's yarn. 2 courses of 60's gives 30's yarn. Folding those two threads together we obtain: 30 cuts of 30's = 1 lb. 30 cuts of 4's = 7½ lbs. 30 cuts of folded = 8½ lbs. 30 divided by 8½ gives 3½ approximately. 3½ times 8 (number of threads in the course) = 28's worsted as the average single counts of yarn. In other words if the fabric were made with 28's worsted yarn throughout, it would correspond in weight to the example given.

When the average counts of the fabric has been obtained, it is much easier to make subsequent calculations on the percentage of the various embroidery threads, for it often happens that the pattern is such that there are several features in the design, one or more of which may give increased take-up to the fancy material. For example, one feature of the fabric may be a straight line where there is little or no extra take-up, whilst this may alternate with another feature where the take-up is considerable.

A few examples may be appended to show how this formula can be applied in other useful directions to the knit goods manufacturer. In the case of plated goods, two yarns are employed of different properties and materials and it may be useful to know the average count and also the percentage of weight of each yarn. For example, the manufacturer may require to cheapen a certain product so as to present another line to his customer which will fill a certain demand. The present fabric may be made of one sort of yarn and by the principle of average counts he will be able to devise counts of yarn which will bring the fabric in range at the price required.

For example, let the fabric in hand be one using 2/24's worsted counts for the ground, but which it is desired to cheapen by adding a plating yarn to the back without increasing the weight of the total garment. Suppose a yarn 32's cotton is available for the back, for convenience let this be stated in worsted counts; $32 \times 840 \div 560 = 48$'s worsted counts. The problem, then, is to find the finer count, which will have to be substituted for 12's on the face and this will be given by the following formula: $48 \times 12 \div (48 - 12) = 48 \times 12 \div 36 = 16$'s worsted count.

To test this result find the counts of these two yarns folded together, namely, 16's face and 48's back, which is given by the formula $16 \times 48 \div (16 + 48) = 16 \times 48 \div 64 = 12$'s counts, as at the start. To come to more exact details it may be desired to figure the actual cost per yard or per pound of these yarns when used and this may be found as follows, using the original formula. Let the cotton splicing yarn be costed at 50 cents per pound, the 16's worsted yarn at $1.25 per pound and the total cost for the average is given by: 48 cuts of 48 = 1 lb. × .50 = .50. 48 cuts of 16 = 3 lbs. × $1.25 = $3.75 + 50 = a total of 4 lbs. at $4.25, or 1 lb. = $1.065. On comparing this with the price of the original all worsted yarn the decreased cost could be accurately figured.

Example: It is required to devise a silk and wool garment which will be equal in weight and texture to one made at present from 30's worsted counts on the 34 gauge frame. For this purpose 2/60's spun silk is available. The problem evidently is to find a second count of worsted which can be used on the back of the silk as plating and which will give a garment of equal weight to the original. Bring the two counts named to the same denomination thus: 2/60's spun silk into worsted $60 \times 840 \div 560 = 90$'s worsted counts. To find the missing number multiply the two given counts together and divide by the difference, as $90 \times 30 \div (90 - 30) = 90 \times 30 \div 60 = 45$'s. Thus the requirements will be met by using the 2/60's spun silk yarn on the face and on the back a worsted count of 45's. If this were found too expensive, a similar size of cotton counts could be substituted, thus $45 \times 560 \div 840 = 30$'s cotton counts.

If it is desired to put this result to the test, it can be done by taking the two counts 90's and 45's and finding their counts folded thus: 90 cuts of 90's = 1 pound, 90 cuts of 45's = 2 pounds, 90 cuts folded = 3 pounds. Thus 30 cuts in 1 pound = 30's count as at start.

This same result may in some cases be obtained more readily by the formula of multiplying the two counts together and dividing by the sum thus: $90 \times 45 \div (90 + 45) = 90 \times 45 \div 135 = 30$'s as before. To complete this case and show further particulars of value to the manufacturer, let the price of the silk be given as $2.50 and that of the worsted as $1.25, then the formula can be supplemented as follows: 90 cuts of 90's = 1 pound = $2.50 and 90 cuts of 45's = 2 pounds = $2.50, or a total of 3 pounds costs $5.00 and 1 pound costs $5 \div 3 = $1.66.

If required, the weight column will yield the weight percentage, namely one-third or 33⅓ per cent of silk and the remaining two-thirds or 66 2/3 per cent of the worsted.

Example: A knitted fabric is made of the following yarns: 2/80's spun silk on the face at $2.25 and this folded with 48's cotton at 50 cents. On the back there is a thicker plating yarn of 20's cotton count at 35 cents. It is required to find the equivalent average counts in the fabric, the average cost per pound of the material and the proportion of each thread in 220 pounds of knit webbing.

The average counts can be found most readily in two operations. All counts are in the same system of numbering so that the first operation is $80 \times 48 \div (80 + 48) = 80 \times 48 \div 128 = 30$'s counts.

In the second operation the count thus found is taken and folded with the remaining 20's count. $30 \times 20 \div (30 + 20) = 30 \times 20 \div 50 = 12$'s count. This would be the result if all three yarns were folded together, but if we wish to retain the three separately then the average over the three counts is given by 12 times 3 = 36's cotton.

These results may to some extent be verified by reverting to the original formula by which the other particulars of cost and weight proportion are most readily found:

80 cuts of 80's = 1 @ $2.25 = $2.25
80 cuts of 20's = 4 @ .35 = 1.40
80 cuts of 48's = 1.66 @ .50 = .83
80 cuts folded = 6.66 lbs. @ $4.48

$80 \div 6.66 = 12$'s counts. $12 \times 3 = 36$ average. $4.48 \div 6.66 = .67$ cents per pound (average),

To obtain the weight of each yarn in 220 pounds of knit webbing the weight column is used $1 \div 6.6 \times 220 =$ 33⅓ pounds. $1.6 \div 6.6 \times 220 =$ 53⅓ lbs. $4 \div 6.6 \times 220 =$ 133⅓.

For proof 33⅓
53⅓
133⅓
220 lbs. total

The Efficient Manager.

BY W. A. C.

The manufacture of hosiery is a very difficult proposition. Some good business men, in other lines, fail in the manufacture of hosiery because they start wrong. They have some relative whom they wish to start in business and who has neither theoretical knowledge nor experience.

One of these good business men started his mill by making his nephew superintendent. He was heard to remark that his nephew would probably make a success of the business because he had run a threshing machine for two months. His nephew, however, tried to drive his help after the same fashion that he drove his horses to his threshing machine. He very soon had nothing but inefficient help. When inventory was taken he showed a loss of several thousand dollars.

Some young business men start into business without knowing the value of experienced labor. They start out with the idea of establishing their importance and authority with all concerned. They proceed to discharge the most efficient help to impress upon all their importance. They continue to do this, and in so doing, are running a training school for the benefit of the practical mill men. They are willing to ruin in order to rule. Experienced employees do not like to work for a man who has nothing to offer but his authority and who shows no appreciation of work well done.

The man who succeeds is the man who has practical experience, who realizes the importance of keeping efficient workmen. He has sufficient practical knowledge of the business to appreciate the worth of experienced labor. In the manufacturing world, the owners of the mill are looking for the man who can control labor and get good results, not for the man who only thinks of showing his authority by discharging his employees.

The laboring class is becoming more intelligent and more efficient. We find the up-to-date corporation furnishing books and teachers for the night school for the employees, thereby improving the intelligence and efficiency of the

laborers. An education brings contentment. The best results cannot be obtained by floating discontented labor looking for more congenial surroundings. The night school education for the mill laborers is a good investment and is so considered by many manufacturers throughout the United States.

Working people are not unlike other people in many respects. They desire more than to live and have their being in a mill from Monday till pay day. They expect more than a salary for their services. A little encouragement and a word of appreciation creates a better feeling between the employer and the employee.

Cooperation.

BY BOB.

Cooperation can be defined success, if it is properly executed, especially in the knitting department. Much success can be obtained by the foreman or superintendent of the knitting department if he will cooperate with his fixers.

First of all the successful foreman should be practical. He should thoroughly understand the working of each make of machine and the adjustments thereon, so if called upon at some critical time by the fixer, he can readily assist him, and get him out of his difficulty.

Some heads of departments imagine it is lowering their dignity to cooperate in this way with the help. Show me the man, regardless of his experience, that knows it all, there is always some new feature cropping up every day. He should take the fixers into his confidence, and if he is the man for the job and as a foreman, has the required ability, he can easily win the fixers' esteem.

It is not the man that is feared who can be called the successful overseer. Respected men rather than feared men make the most efficient foremen.

If there is more cooperation along these lines there will certainly be better results.

Cooperating with men does not oblige one to make chums of them; but if they find the foreman taking an interest on their behalf, they will take more interest in their work, which means better work, a larger production and a man to look upon as their leader.

Two Recent Permutit Installations.

Cheney Brothers, South Manchester, Conn., have contracted with the Permutit Company, 30 East 42nd Street, New York, for a new Permutit water softening installation of a capacity of 100,000 gallons per day. This is the second installation made by Cheney Brothers, they having been one of the first American silk mills to adopt the Permutit system of water softening. Their first installation was one of 70,000 gallons capacity and was made early in the year of 1912. This Permutit system will go in the new filter house recently constructed at the South Manchester Mill and will deliver a clear, colorless water of absolute zero hardness. Provision has been made for an installation in the future of two new units, these also to be of 100,000 gallons capacity per day.

The National Artificial Silk Company, of Cleveland, Ohio, have contracted for a Permutit installation of 138,000 gallons capacity per day, which is to be installed to remove all of the lime and magnesia from the water supply for their new bleachery. The present system is being designed so as to permit of an increase of the water softening plant the ultimate intention being to install six similar units in all. The filters will be installed so as to be in operation when the new plant of the company is started, which will be some time early in the coming fall.

The Knit Goods Market.

Prices for 1917 spring merchandise are causing hosiery and underwear manufacturers more concern than perhaps any other phase of the knit goods market.

The underwear opening is farther advanced than hosiery, but the situation is not satisfactory from the manufacturer's standpoint. Prices have been named by a great number of mills and considerable business has been booked. While advances are noted, some of them substantial, the complaint is made in some quarters that not a few mills have adhered to last year's prices, which they have been able to do by cheapening their product.

"We are not going to let our competitors take all the business while we sit here doing nothing," says one important manufacturer of women's union suits and two-piece garments. "They have forced us into a low-down sort of competition, and we'll meet them, by giving them underwear at old prices, but made accordingly."

It all comes from the merchants' determination to adhere to the popular price policy, a policy which it is freely predicted is going to be responsible for flooding the market with cheap, inferior and to a great extent, trashy merchandise that ordinarily could find an outlet only through the sidewalk and pushcart mart of the slums. The advice of a leading manufacturer of underwear to the distributing trade is "Don't buy trashy stuff, and don't overbuy of any kind. It will be easier if there shall come a decline, to get out whole with standard merchandise than with some of the stuff that is being offered at last year's prices."

While no general comparison of underwear prices can be made, one line that went to the jobber last year at $1.85 is priced at $2.25 for next spring. Another has been increased to $4.10 from $3.50. It is asserted these new prices are to be adhered to, whether or not the trade approves.

There has been no end of jockeying by manufacturers in showing samples and naming prices for deliveries for next spring, and hosiery men have been especially conspicuous in "dodging the issue." This attitude, however, is due less to a spirit of watchfulness than the fear that changed conditions may make prices named now appear disproportionately lofty by the time shipments become due. Again, some mills are not going into the new season for the reason that they are far behind in deliveries for the current season.

A line of mercerized cotton hosiery for women which had been going at 25 cents a pair retail, has been priced at $2.30 to $2.50 for next spring as a feeler. It is a representative line, showing good value, and it is believed will move in good volume at the higher prices.

A women's line, mercerized boot and lisle top, is being tried out at $1.85 as a 25 cent retail proposition. A representative of the mill making this line, says he believes the silk situation points toward an easing in the mercerized yarn market.

A Pennsylvania manufacturer has advanced two pound 84 needle half hose made from waste yarn to 65 cents, from 57½ to 60 cents. Another mill is getting 75 cents for the same class of socks of 2½ pounds.

While few doubt that the knitting industry is on a basis of stability that will continue for many months to come, there is that psychological influence that must be reckoned with. The deterrent to a vigorous going after next season's business on a new price basis is fear. One of several hosiery mill questions to be disposed of, if possible, before nailing down new prices, is that of rise and fall. It is being taken up in a way that presages a scale readjustment on at least a few lines.

Manufacturers of misses ribbed who suddenly awakened to the fact that a five cent rise on size 7 is inadequate, recently aroused an interest among competitors, with the result that there now prevails an almost unanimous opinion that, particularly for heavy weight hosiery, the rise must be 7½ or 10 cents.

A Philadelphia manufacturer who has gone extensively into the matter of costs has shown that for size 8 and over, 7½ cents additional over the price for size 7 barely compensates for the greater yarn cost, taking the usual per cent of seconds into consideration. This manufacturer, since June 1st, has changed his schedule as follows on a price, say, of 90 cents for 2 pound, size 7:

Size	7	7½	8	8½	9	9½
Price	90	97½	$1.05	$1.15	$1.25	$1.35

This manufacturer allows a fall of 5 cents as the sizes descend from 7. Another mill makes a five cent fall and a five cent rise to size 7½, where the rise becomes 7½ cents, where it is maintained to 8½ and then is jumped to 12½ cents. This schedule figures out as follows:

Size	7	7½	8	8½	9	9½
Price	90	95	$1.02½	$1.10	$1.22½	$1.35

The necessity for the increase in the rise as the size advances is accounted for by the explanation that in the heavier weights the demand is for a greater percentum of the larger sizes.

While the inquiry that has been conducted pertains more directly to misses ribbed hosiery, there is a feeling among manufacturers that there should be a rise and fall readjustment applicable to nearly all lines. It is a matter that has been entirely overlooked by many mills, but now that the ball has been started rolling it is believed the trend will be toward a new scale, particularly if present yarn prices shall continue or advance.

In view of the chaotic situation which developed early in June when manufacturers balked at any hard and fast schedule of prices for 1917 spring hosiery, an inquiry was started for ascertaining estimates of increased costs of production at this time in contrast with June, 1915.

Queries on this subject were submitted through the National Association of Hosiery and Underwear Manufacturers to mills in the southern, central west, middle and New England states. Based upon 25 replies received at this writing, the average increase is approximately 10 per cent on labor, 30 per cent on cotton yarns, 35 per cent on mercerized yarns, 25 per cent on paper boxes, 125 per cent on dyeing and 100 per cent for bleach.

Buttons and edging for underwear are considerably higher than a year ago. Paper for lining packing cases shows an increase of over 100 per cent, and the nails for putting the sides, ends, top and bottom of the packing case together cost $4.40 a keg, against $2.70. And yet it is being made to appear that next season's merchandize must be sold at last season's prices, to satisfy the whim of dealers who arbitrarily adhere to the fixed or popular price policy.

Obedience to custom, however, is no more pronounced among merchants than in the hosiery industry. "Why are you still getting only a five cents rise, when it is no longer sufficient under the present cost of yarns?" a small owner was asked.

His reply was: "It has been customary so long to get five cents rise that it seems to have become established. I don't know that our mill will make any change."

This manufacturer is one of those favoring an educational campaign intended to bring the retailer to a disposition to abandon a custom and price goods on the basis of their cost plus a fair profit.

Increased costs of production and a rearrangement of the rise and fall schedule are to be seriously considered at the next meeting of the Philadelphia Hosiery Manufacturers and the Pennsylvania Underwear Manufacturers, and are scheduled for a free-to-all discussion at a meeting of the Knit Goods Manufacturers of New York and the New England states, to be held in Albany July 14th.

Present demand upon jobbers is stronger than upon mills, the retail trade having been buying heavily of late, bearing out recent predictions of a hosiery shortage.

Mills on silk lines are exceptionally well supplied with business, some of them being sold up for the year. Of course there always will be merchants for spot delivery, if the buyer be willing to pay the price. An incident which is vouched for is illustrative of what is going on in some of the sold-up mills. A buyer was told that the mill could not consider an order which he had come to place, except it draw on what was ready for shipment to another customer.

"The price?" asked the buyer.

When he was given a quotation he asked: "Is that what your customer is paying?"

He is paying 7½ cents a dozen less," replied the mill manager.

"Why should I pay more?"

"Because the market is much stronger than when he bought."

The buyer placed an order and the previous customer will get delivery on schedule. It was simply advancing the price in cadence with the general market movement.

"Cancellation of this order will not be asked and will not be accepted for any reason" is the language employed by a Philadelphia hosiery manufacturer when confirming an order for next season. The mill is taking every precaution for averting a repetition of the flood of cancellations that poured in nearly two years ago.

The same mill when booking an order for export exacts a deposit if the order calls for special branding or packing, and accepts the business only for cash against bill of lading New York. In many respects lines are being drawn more tightly and credit ratings more searchingly scrutinized.

The labor situation in Philadelphia is causing some alarm. Thus far sporadic attempts to sow the seeds of discord in knitting mills have had short life. Disturbers have been dismissed the moment their presence in a mill becomes known to the management. However, a movement against the entire textile industry in Philadelphia is being

directed from New York where threats of a severe strike, unless employers grant shorter work days, are freely made.

Sweater manufacturers have been more disturbed by the activities of the union than any other branch of the knitting trade, and a few mills recently have been unionized, but so far there has been no shortening of the work day.

Among the Knitting Mills.

The G. H. Y. Hosiery Co., Concord, N. C., was recently organized; J. F. Goodman being president; A. Jones Yorke, vice-president, and A. R. Hoover, secretary-treasurer. This company has incorporated with $100,000 capital, and will build a knitting mill with daily capacity of 300 dozen pairs of hose. The contract for a two-story building 100 x 80 and a one-story building 50 x 20 feet has been awarded and the necessary machinery purchased.

Papers have been filed for the incorporation of the Signal Knitting Mill, at Chattanooga, Tenn. A capital stock of $150,000 will be authorized. The incorporators are W. A. Jones, Floyd M. Murphy, G. H. Miller, George S. Arnold and Oscar L. Bunn. Various kinds of knitted underwear will be manufactured.

A hosiery mill capitalized at $50,000 is being promoted at Hopewell, Va. A three-story building of brick construction, with an equipment of machinery to employ fifty operatives is proposed. F. L. Conway of Franklinton, N. C., and F. L. Temple of Roanoke, Va., are the company's organizers.

The Board of Trade of Griffin, Ga., is promoting a hosiery mill for that city. The secretary will furnish information.

Work has been started on a factory at Waupun, Wis., 120 x 53 feet, three stories high and basement, for the Paramount Knitting Company. The lease on its present quarters expires November 1, and it is planned to have the work completed before that date.

A new corporation has been organized at Reading, Pa., as the Royal Underwear Company to manufacture high-grade women's union suits. Its initial equipment will provide for a capacity of 125 to 150 dozen per day. The company will specialize on a new patented closed crotch suit known as the "Triad," on which H. C. Gulgrich of the company owns the rights.

The Lange Knitting Mills, Chicago, Ill., have been incorporated by David F. Shegren, Emil Lange and Frederic Gronberg with a capital stock of $28,000. It is understood that this concern succeeds the Emil Lange Knitting Mills, manufacturers of cardigan jackets and sweaters.

The Crescent Hosiery Mills Company at Scotland Neck, N. C., has let the contract for a structure which will be erected to supplant the present building, consisting of a main building 110 x 63 feet and an ell 25 x 25 feet. Additional machinery will be purchased and installed as early as practicable.

The Magnet Knitting Mill, Clinton, Tenn., has awarded contracts for an additional building, machinery, etc. The new building will be two stories high and 250 feet long by 75 feet wide, of reinforced concrete with brick curtain walls. New knitting machinery will be added to increase the daily capacity to 2000 dozen pairs of hose, and the equipment will include electric drive with individual motors. The present finishing department will be changed into a box factory and an addition will be built to the dyehouse.

The hosiery plant, known as the Victor Hosiery Mill at Tamaqua, Pa., and operated by Clayton Walters, has been enlarged by the addition of twelve knitting machines.

Construction on the dyehouse for the Underwood Silk Fabric Company, Palatine, N. Y., manufacturer of glove silk underwear and chamoisette cloth, has been started.

It is understood that the business of the Colonial Knitting Company, Ltd., Guelph, Ont., is now being carried on at Elmira, Ont. A building about three times larger than the plant operated at Guelph is utilized. A new limited company is being organized.

Articles of incorporation have been filed by the West Duluth Knitting Mills, Duluth, Minn. The incorporators are: J. A. Liedfors, Olaf A. Bertilson and P. G. Borgstrom. Sweaters and hosiery are to be manufactured.

The Maline Mill, Winston-Salem, N. C., is to add seven knitting machines and 19 sewing machines. Contracts have been awarded.

The Thread Mills Company, Spray, N. C., has completed arrangements for a site of 100 acres of land for its proposed knitting mill at Leaksville. It is understood that a large number of operatives' houses will be built to take care of the force to operate the mill.

An addition is being built to the plant of the West Branch Knitting Co., at Milton, Pa., manufacturers of men's flat underwear and men's and women's seamless and full fashioned hosiery.

The capital stock of the Cleveland Knitting Mills Co., at Cleveland, O., has been increased to $150,000. The company manufactures fancy knit goods and specialties.

The Stephenson Underwear Co., South Bend, Ind., announce the building of an additional plant to be used for the manufacture of underwear. This will be built on the east side of the present plant, extending from Colfax Avenue south to the present mill No. 3. A cotton yarn mill with a capacity intended to be 1,000,000 pounds per year will also be built south of the present plant. Both buildings will be of the latest type mill construction, reinforced concrete and steel, with outside towers for elevators and stairways. Contracts for the necessary new machinery have been placed.

It is reported that the plant of the Rosenau Hosiery Mills, at Tuscaloosa, Ala., manufacturers of men's, women's and children's cotton hosiery, will be considerably enlarged.

Contract has been let for the construction of the seven-story mill, 120 x 130 feet, to be erected by the Globe Knitting Works, Grand Rapids, Mich. This is in line with the intention of the Globe Knitting Works to concentrate their business in Grand Rapids.

W. B. Clements and C. A. Adams, Durham, N. C., will build a mill for knitting cotton hosiery.

The Fidelity Hosiery Mills Co., Newton, N. C., will add 50 knitting machines, and has purchased this new equipment.

The Reidsville (N. C.) Hosiery Mills has been organized. This company will build a 105 by 44-foot mill and install 50 knitting machines with accompanying equipment, driven by electric power. It will obtain its current from the Southern Power Co.

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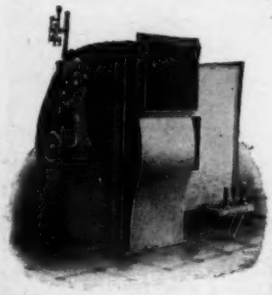

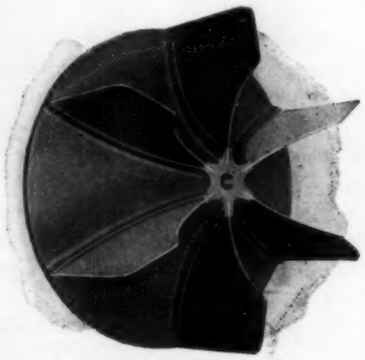

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Size and Gauge of Circular Knitting Machines.

Circular knitting machines, as used for the making of children's socks, women's hose, and men's hose and half-hose, etc., are built with different diameters to suit the size of the article required.

The rise in diameters of hand machines is sometimes one-eighth of an inch in diameter, and in some cases automatic knitting machines are also built in eighths, but usually this latter class of machines, both plain and rib, are built in quarter inches, sizes varying from 3 inches for small children's socks to 4½ inches for full men's hose and half-hose.

The method of indicating the gage and size of a circular knitting machine is somewhat abstruse, as it does not give a clear indication of the gauge direct, and it requires quite a mathematical calculation—at all events for the average knitter or knitter-machanic—before the number of needles per circumferential or linear inch is obtained.

For instance, if you ask anyone who may be even well conversant with the trade, which machine has the least number of needles per circumferential inch an 84—4½ gage machine or a 68—3¾, he probably will not be able to tell you.

Perhaps, owing to his long experience, he will say that there are the same number of needles per linear or circumferential inch, as he knows that the same count of yarn is worked on both machines, but this does not definitely decide that the number of needles per linear inch is exactly the same, as most machines have a range of yarn counts that it is possible to work, and these ranges necessarily overlap with other ranges.

The formula for finding the needles per linear or circumferential inch is as follows: Number of needles per circumferential or linear inch = machine × 7 ÷ diameter (in inches) × 22.

Therefore for a 84—4½ machine needles per circumferential inch = 84 × 7 ÷ 4½ × 22 = 588 ÷ 99 = 5.94 = practically 6 needles.

And for a 68—3¾ machine needles per circumferential inch = 68 × 7 ÷ 3¾ × 22 = 5.77 = practically 5¾ needles, which is really a little coarser from a theoretical standpoint at all events.

The next point to be considered is: What will be the number of needles in each of a series of machines built to make the whole range of sizes from small children's socks to the full women's or men's size, the whole of the machines to be of the same gage, *i.e.*, capable of working the same count of yarn?

This involves a modification of the first formula, as it is the total number of needles of a given diameter and of a given number of needles per circumferential inch.

The formula, merely re-arranged, then becomes, total number of needles = diameter (in inches) × 22 × needles per circumferential inch ÷ 7.

Supposing the desired number of needles per inch is 6. a number that enables coarse hose and half-hose suitable for boys' and men's wear to be made.

$$\text{Then for 3" diameter} \quad \text{Total number of needles} = \frac{3 \times 22 \times 6}{7} = \frac{396}{7} = 56.57$$

$$\text{For 3¼" diameter} \quad \text{Needles in machine} = \frac{3\frac{1}{4} \times 22 \times 6}{7} = \frac{429}{7} = 61.28$$

$$\text{For 3½" diameter} \quad \text{Needles in machine} = \frac{3\frac{1}{2} \times 22 \times 6}{7} = \frac{66}{1} = 66.00$$

$$\text{For 3¾" diameter} \quad \text{Needles in machine} = \frac{3\frac{3}{4} \times 22 \times 6}{7} = \frac{495}{7} = 70.71$$

$$\text{For 4" diameter} \quad \text{Needles in machine} = \frac{4 \times 22 \times 6}{7} = \frac{528}{7} = 75.42$$

$$\text{For 4¼" diameter} \quad \text{Needles in machine} = \frac{4\frac{1}{4} \times 22 \times 6}{7} = \frac{561}{7} = 80.14$$

$$\text{For 4½" diameter} \quad \text{Needles in machine} = \frac{4\frac{1}{2} \times 22 \times 6}{7} = \frac{594}{7} = 84.84$$

Necessarily, as the number of needles in a machine cannot be fractionally divided, the machinist must cut the cylinder to an approximation, and hence we get a series of machines each with approximately 6 needles per circumferential or linear inch as follows:

(1) 56—3 (2) 60 or 62—3¼. (3) 64 or 66—3½. (4) 68 or 70—3¾.

(5) 76—4. (6) 80—4¼. (7) 84—4½.

Of course a machine builder will not stand at trifles, and if a manufacturer states that a majority of his goods are made with slightly finer yarn, a machinist will willingly cut his cylinders a little finer, such as 88—4½ or even 88—4¼, or if slightly coarser yarns are employed, a 4½ inch cylinder may be cut 80 or even a 4¼ inch cylinder 76, and so on.

Similarly, a range of machines having 8 needles per inch can be calculated.

Thus a 4½ inch diameter having 8 needles per circumferential inch would have, approximately, 112 needles, a 4¼ inch machine 108, a 4 inch machine 100, a 3¾ machine 92 to 96, a 3½ inch machine 88 needles, a 3¼ inch machine 80 to 84 needles, a 3 inch machine 76 needles, the calculations in all cases being approximate and practical.

The next question is: What diameter is suitable for a certain size? This, perhaps, is solved best by the manufacturer himself, for it is he who must decide his size widths. For rib hose and half-hose, perhaps a 3 inch machine will make 00's, 0's and 1's, a 3¼ inch machine 2's, a 3½ inch machine 3's, and 3½ inch machine 4's, a 3¾ inch machine 5's, a 4 inch machine 6's, a 4¼ machine 7's, and a 4½ machine full women's or men's according to gauge and outsizes.

For plain hosiery, especially in the case of women's fine hose a 3¾ inch diameter or a 4 inch diameter machine will make full women's, and it would certainly be difficult for a buyer to say whether a ladies' hose had been made on a 204—3¾ inch or a 204—4 inch machine, and we almost said a 198—3¾ inch or a 216—4 inch machine.—*The Hosiery Trade Journal.*

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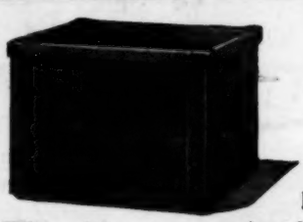

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Notes About Men You Know.

J. H. SPENCER, the popular southern representative of the Barber-Coleman Co., with offices at Greenville, S. C., is now rapidly recovering from the effects of an operation for appendicitis which was performed several weeks ago.

P. J. MCNAMARA who was appointed Receiver for the Lang Manufacturing Co., at West Point, Ga., sometime since, advises that the plant and machinery of this company will be sold by order of the Court on July 12th. Mr. McNamara, who is well known to the converting trade, recently resigned from the active management of the Lanett Bleachery and Dye Works, with which plant he has been associated for so many years.

JOHN B. RAY of New Bedford, has become overseer of spinning for the Empire Cottons, Ltd., Welland, Ont. Mr. Ray began his mill experience as a boy in the Slater Mills, Jewett City, Conn., and worked his way up to overseer of ring spinning, which included spooling, ball and beam warping, sizing and yarn printing. He has also held positions with the Glasgow Gingham Mills at South Hadley Falls, Mass., the Wingobrocking Mills, Philadelphia, the Beaver Mills and Eclipse Mills at North Adams, Mass., the Falls Company at Norwich, Conn., the Dwight Mfg. Co., at Chicopee, Mass., the Taber Mill, New Bedford, the West Boylston Co., at Easthampton, Mass., and others.

JOSEPH EUGENE DUNSON, president of the Dunson Mills, LaGrange, Ga., who died recently after a short illness, was a most virile force in the development and progress along all lines in LaGrange and Troup county. In business, educational, religious and social circles he was a recognized genius and leader. He was the organizer and builder of the Dunson Mills in 1910, and later he launched the Troup Company, the People's Bank of Franklin, and other important business institutions. He was an important factor in many business concerns in his section.

JAMES G. MERRIMAN terminated his long connection with the Standard Spinning Co., of Oswego, N. Y., which is one of the plants of the Frisbie & Stansfield Knitting Co. at the beginning of this month. Mr. Merriman has been with this concern for thirteen years. Under the management of Mr. Merriman the plant has been extensively enlarged since 1903, its capacity greatly increased and a ready market for its yarns developed throughout the country. In the future, its products will be almost entirely absorbed by the mills of the Frisbie & Stansfield Co., located at Utica, Syracuse, Camden and Hamilton, N. Y. Wm. MacDonald will continue as superintendent of the yarn mill, which position he has occupied for the past several years.

CEASAR CONE, president of the Proximity and White Oak Mills, Greensboro, N. C., recently completed an automobile trip from Greensboro to New York and is now at Lake Placid, N. Y., with his family at his summer home.

W. O. TALLENT has resigned as superintendent of the Aldora Mills, Barnesville, Ga.

J. E. NORKETT has accepted the position of superintendent of the Gem Yarn Mills, Cornelius, N. C.

HENRY A. KING of Boston has accepted the position of superintendent at the Lanett Bleachery and Dye Works, West Point, Ga.

GEO. E. SINKINSON, who was formerly connected with the Great Falls Bleachery at Summersworth, N. H., is now assistant superintendent at the Lanett Bleachery and Dye Works.

E. M. TERRYBERRY was one of the prominent speakers at the Southern Textile Association Convention at Asheville, N. C. Terry has not as yet decided which political party he desires to represent in Congress, but his maiden speech attracted so much attention that it is quite probable that he will be heard from later.

ELMER L. BOWEN, who for the last 18 years has been superintendent of the Appleton Co., Lowell, Mass., has been appointed agent, succeeding his father, the late Frank A. Bowen. George R. Haithwaite, formerly assistant superintendent, has been appointed superintendent of the plant.

W. A. WALKER has been promoted from day spinner to night carder and spinner at the Vass (N. C.) Mills.

GEORGE F. MORAN, for many years with the Pacific Mills as assistant chemist, has been appointed head of the chemistry department to succeed the late John Alden.

L. H. SEDBERRY, of Lumberton, N. C., has accepted the position of overseer of spinning at the Locke Mill, Concord, N. C.

JOHN G. WHITTAKER has resigned as manager of the Saylesville and Central Falls (R. I.) plants of the Glenlyon Dye Works, his resignation taking effect on the first of July, to become manager of the Lonsdale Bleachery and Dye Works. Mr. Whittaker will take the place of Charles N. Robertson at Lonsdale. H. F. Schwartz, who has been superintendent at the Central Falls plant of the Glenlyon Dye Works, will become manager of that department, and Thayer P. Gates, who has been superintendent at the Saylesville plant, will become manager of that department. Mr. Whittaker has been connected with the Glenlyon Dye Works for thirty-four years.

P. D. BULLARD of Pembroke, N. C., has accepted a position as overseer of spinning at the Maple Mills, Dillon, S. C.

WILLIAM DOOTSON has accepted a position as superintendent of the White City Manufacturing Company, Athens, Ga.

EDWARD WHEELDON, who has been employed at the Potomska Mills, New Bedford, for the past thirty years, recently resigned his position as overseer of weaving.

R. H. LAYTON has been promoted from carder and spinner to superintendent of the Holt-Morgan Mills, Fayetteville, N. C.

JOHN ROBINSON has been appointed overseer of weaving for the Warren (R. I.) Manufacturing Co., succeeding George Wooley.

JAMES OATES has resigned as overseer of spinning at the Buck Creek Cotton Mills, Siluria, Ala., to become night overseer of spooling, twisting and winding at the Unity Spinning Mills, LaGrange, Ga.

ALBERT BEACHTOLD has resigned as superintendent of the Chinnabee Cotton Mills and Highland Mills, Talladega, Ala.

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W. C. ROWLAND of Rockingham, N. C., has accepted the position of overseer of weaving at the Manetta Mills, Lando, N. C.

GEORGE M. HEWITT, general superintendent of the Stephenson Underwear Mills, South Bend, Ind., for the last sixteen years, has resigned.

C. M. THOMPSON of Harriet Mill No. 3, Henderson, N. C., has accepted the position of assistant superintendent at Weldon (N. C.) Mfg. Co.

C. V. JAMES has accepted a position as night overseer of twisting and spooling at the Modena Mills, Gastonia, N. C.

CHARLES W. ADAMS has been appointed overseer of knitting for the Peerless Hosiery Co., Ltd., London, Ont.

R. F. Doss has accepted the position of superintendent of the cotton mill of the Villa Rica (Ga.) Oil Company.

T. J. REYNOLDS of LaGrange, Ga., has accepted a position as overseer of spinning at the Buck Creek Cotton Mills, Siluria, Ala.

ANDREW YORSTON, for 25 years prominently identified with the textile industry in Rhode Island, has been appointed assistant manager of the Apponaug Co., Apponaug, R. I.

E. A. HOLT of Graniteville, S. C., has accepted a position as overseer of carding at the Greer (S. C.) Mill.

J. C. TIDDY has resigned as carder and spinner at Troy, N. C., to accept a similar position at the Holt-Morgan Mills, Fayetteville, N. C.

JAMES CURTAIN, formerly overseer of spinning for the Marland Mills, Andover, Mass., has accepted a similar position with the Winsted (Conn.) Hosiery Co., Inc.

WILL GREENWOOD of Eatonton, Ga., has accepted position as overseer of weaving at the Social Circle (Ga.) Cotton Mills.

CHAS. A. WHITE has resigned his position with the Puritan Cordage Mills, Louisville, Ky.

CLARENCE A. LAWTON, a recent graduate from the Bradford-Durfee Textile school, Fall River, and the medalist of the class of 1916, has accepted a position with the Hamlet Textile Company of Woonsocket, R. I., as secretary to the superintendent.

W. E. LINDSAY, assistant treasurer of the D. E. Converse Company, Glendale, S. C., has been promoted to president-treasurer to succeed the late A. H. Twitchell. Mr. Lindsay has been connected with this company for many years.

T. L. CANTRELL has resigned as overseer of weaving at the Dixie Mills, LaGrange, Ga., to accept a similar position at the Pelham (Ga.) Mills.

G. W. ROLLINS has been promoted from second hand in weaving at the Henrietta Mill No. 1 to overseer of weaving and assistant superintendent of Mill No. 2.

W. T. ADAMS is the new second hand of the knitting department for The Wovenright Knitting Co., Cleveland, O.

W. H. WILLIAMS has resigned his position at the Pauline Mill, Kings Mountain, N. C., to become overseer of carding at the Harden Mfg. Co.. Worth, N. C.

WILL MORRIS has been promoted from second hand to overseer of spinning at the Fulton Bag and Cotton Mills, Atlanta, Ga.

JESSE COKER has resigned as overseer of spinning at the Walton Mills, Monroe, Ga., and accepted a similar position at Dalton Ga.

R. R. MCCRAW has been promoted from overseer of weaving to night superintendent of the Social Circle (Ga.) Cotton Mills.

W. A. CARPENTER, who has had charge of the spinning at the Utica Steam and Mohawk Valley Cotton Co., Utica, N. Y., for the past four years, has resigned to accept a similar position at the Hope Mill of the Lonsdale Co., at Hope, R. I.

W. C. MADDOX has been promoted from night to day overseer of twisting at the Unity Spinning Mills, LaGrange, Ga.

A. F. HEDGEPATH has been transferred to overseer of No. 1 and No. 3 carding at the Woodside Mills, Greenville, S. C.

S. C. HOWELL of Vass, N. C., has accepted position of overseer of spinning at the Highland Cotton Mills, High Point, N. C.

W. M. CHANDLER, formerly overseer of carding at the Woodside Mills, Greenville, S. C., has accepted a similar position with the Williamston (S. C.) Mills.

J. B. HARRIS of the Grendel Mill No. 2, Greenwood, S. C., has accepted position of overseer of spinning at the Greer (S. C.) Manufacturing Company.

C. H. BURNETT of Danville, Va., has accepted a position of overseer of carding at Weldon (N. C.) Mfg. Co.

E. MORAN has accepted the position of superintendent of the Quitman (Ga.) Mfg. Co.

W. A. BIERMAN has been elected secretary and treasurer of the Flint River Mills, Albany, Ga.

D. I. WILLIAMS has been promoted from overseer of carding to superintendent of Chadwick-Hoskins Mill No. 5, Charlotte, N. C.

W. E. BURGESS has accepted a position as overseer of weaving with the Fountain Inn (S. C.) Mfg. Co.

R. T. Persons has succeeded R. P. Brooks as president of the Forsyth (Ga.) Cotton Mill.

J. M. PERMENTER has accepted position of superintendent of the Millen (Ga.) Mills.

W. E. FORD of Langdale, Ala., has accepted a position as overseer of spinning at the Central Mills, No. 2, Sylacauga, Ala.

R. M. MATTHEWS has been promoted from overseer of cloth room to superintendent of the Aldora Mills, Barnesville, Ga.

As a reliable sizing for warps the Arabol Mfg. Co., 100 William St., New York City, recommend their Sizeoleum. It does not call for the addition of tallow. Southern manufacturers are said to be greatly pleased with it. It gives excellent results on warps for grey goods in the export grade and for converters' goods. Used with starch (Arabol starch, sizing starch), it works nicely as a sizing on warps for sheetings, print cloths, shirtings, ducks or similar goods.

The C. W. Hunt Co., Inc., West New Brighton, N. Y., have just issued a new valve catalog W-15-3, describing the Hunt cut-off valve for coal, ashes, coke, ore, stone, sand, gravel, and similar materials. This catalog is of standard 6 x 9 inches in size and contains illustrations and complete descriptions of the standard types of gates and valves made by this company for the uses enumerated. Free copies will be sent to interested inquirers.